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TWENTY-FOURTH ANNUAL REPORT

ON THE

New York State Museum of Natural History,

Albany

BY

THE REGENTS OF THE UNIVERSITY

OF THE

STATE OF NEW YORK.

[EX-OFFICIO TRUSTEES OF THE MUSEUM.]

TRANSMITTED TO THE LEGISLATURE APRIL 18th, 1871.

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No. 68.

IN SENATE,

April 18, 1871.

TWENTY-FOURTH ANNUAL REPORT

ON THE

STATE MUSEUM OF NATURAL HISTORY, BY THE REGENTS OF THE UNIVERSITY OF THE STATE OF NEW YORK.

UNIVERSITY OF THE STATE OF NEW YORK:

Office of the Regents,
Albany, *April* 18, 1871.

To the Hon. Allen C. Beach,
President of the Senate:

Sir.—I have the honor to transmit the Twenty-fourth Annual Report of the Regents of the University, on the State Museum of Natural History.

I remain, very respectfully,
Your obedient servant,
JOHN V. L. PRUYN,
Chancellor of the University.

REGENTS OF THE UNIVERSITY.

[*Ex-officio* Trustees of the State Museum of Natural History.]

JOHN V. L. PRUYN, LL.D., CHANCELLOR.
ERASTUS CORNING, VICE CHANCELLOR.

EX-OFFICIIS.

JOHN T. HOFFMAN, LL.D., GOVERNOR.
ALLEN C. BEACH, LIEUTENANT-GOVERNOR.
HOMER A. NELSON, SECRETARY OF STATE.
ABRAM B. WEAVER, SUPT. OF PUBLIC INSTRUCTION.

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J. CARSON BREVOORT.
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OSWALD OTTENDORFER.
JOHN L. LEWIS.
HORATIO G. WARNER, LL.D.

SAMUEL B. WOOLWORTH, LL.D., SECRETARY.
DANIEL J. PRATT, ASSISTANT SECRETARY.

STANDING COMMITTEE OF THE REGENTS, SPECIALLY CHARGED WITH THE CARE OF THE STATE MUSEUM.

1871.

THE GOVERNOR.
MR. CORNING.
MR. CLINTON.
MR. HALE.
MR. BREVOORT.
MR. JOHNSON.
THE SUPERINTENDENT OF PUBLIC INSTRUCTION.

DIRECTOR OF THE STATE MUSEUM:

JAMES HALL, LL.D.

ASSISTANTS:

R. P. WHITFIELD, IN GEOLOGY AND PALÆONTOLOGY.
J. A. LINTNER, IN ZOÖLOGY.
CHARLES H. PECK, IN BOTANY.

REPORT OF THE REGENTS.

To the Honorable the Legislature of the State of New York:

The Regents of the University, as trustees of the State Museum of Natural History, respectfully report:

The law "in relation to the State Cabinet of Natural History," passed at the last session of the Legislature, establishes "the Cabinet as a Museum of Scientific and Practical Geology and general Natural History," placing it on a permanent basis, and providing for its care and enlargement. The trustees confidently look to its more systematic and vigorous operation under the provisions of this law.

The report of the Director exhibits the work of the past year. Valuable additions by collections, exchange and purchase have been made, lists of which are appended.

In the department of Botany, Mr. Peck has labored with eminent success. He has made large additions to the Herbarium, and his investigations of the Fungi are a valuable contribution to our knowledge of that class of plants.

Mr. Lintner has continued his investigations in Entomology with gratifying results.

The usual statement of receipts and expenditures is herewith communicated.

All of which is respectfully submitted, on behalf of the Regents.

JOHN V. L. PRUYN,
Chancellor of the University.

ACCOUNT CURRENT, 1869-70,

WITH APPROPRIATIONS FOR THE STATE CABINET OF NATURAL HISTORY.

Dr.

To compensation of Botanist (in part, the balance being paid by the Comptroller)	$619 91	
To special increase and preservation of the Zoölogical collection	1,000 00	
To additions and preservation of the collection,	500 00	
		$2,119 91

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By deficiency brought forward from 1868–9	$769 91	
By expressage	34 20	
By increase and preservation of the collection,	327 71	
By printing	19 00	
By salary of Taxidermist	100 00	
By stationery	1 85	
By traveling expenses of the Botanist	59 76	
By balance carried to new account	807 48	
		$2,119 91

I have examined the foregoing account current, with the vouchers in support thereof, and have found the same correct.

ERASTUS CORNING.

REPORT ON THE STATE MUSEUM.

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REPORT OF THE DIRECTOR.

To the Honorable the Board of Regents of the University of the State of New York:

GENTLEMEN:

I have the honor to present to you the following report, regarding the condition of the State Museum, with a brief statement of the additions made to the collections, and work done in the several departments during the past year:

The collections in the various departments constituting the State Museum of Natural History, are in good condition, and so far as space and cases will permit, are satisfactorily arranged, and, to a very large extent, properly labeled. A list of additions to each one of the departments will be found appended to this report.

DONATIONS TO THE MUSEUM.

The increase of the Zoölogical Department, by donation, has not been very extensive, although some important acquisitions have been made. The number of contributors, as shown by the list of donations, has been nine. Through the Smithsonian Institution, the collection of birds' eggs has been increased, and we are indebted to several citizens of the State for other objects in this department, and our acknowledgments are due to Col. Richard J. Dodge, U. S. A., for a specimen of the Black-tailed Deer, two specimens of the Prairie Wolf, and two of the Prairie Dog. The principal accession, however, has been made through the legislative appropriation for the "Special increase of the Zoölogical Collections," in the purchase of a series of skeletons, prepared under the direction of Prof. H. A. Ward, of Rochester. A list of these will be found appended to the report.

In the Botanical Department, the record shows no less than twenty-three individuals contributing to the collections, and among species thus added are many rare and interesting forms, some of which are new to the State, and, among the lichens and fungi, several species new to science.

The special report of Mr. Peck, in this department, will indicate the large additions made on his part, and supersede the necessity of further detail in this place.

In the Geological and Mineralogical Departments, we have the names of twenty-five contributors, and among the collections thus acquired are some of much interest and importance. Large accessions have likewise been made by the collections of the Director and Assistants.

To the Department of Archæology and Ethnology there are four contributors, and the purchase of the Simms collection, by the Legislature, has added largely to these collections.

To the Library, donations have been received from nine individuals and societies, and this fact deserves remark, since at least *one thousand copies* of the annual report of the Museum are distributed to individuals, libraries, scientific societies and institutions of learning.

Some additions have been made to the departments of Palæontology and Conchology, by exchanges, as will be seen by the schedules attached.

The general collections of the Museum have been greatly increased during the past year, as will appear from the following brief summary.

PURCHASE OF THE SIMMS COLLECTION.

The Legislature of the State, by an appropriation of $5,000,* authorized the purchase of the collection of Mr. Jephtha R. Simms, of Fort Plain, N. Y., consisting of objects of natural history, historical relics, coins, tokens, etc.

Of this collection the Ethnological department will receive additions indicated, in the catalogue submitted by Mr. Simms, under 236 numbers: the department of Palæontology, 204 numbers, and the Mineralogical department, 410 numbers.

The gold and silver coins of the collection were not received at the State Museum, but were taken to the office of the Secretary of State for examination. A box (No. 11) said to contain the copper coins, tokens, colonial and continental currency, private or corporation currency, postal currency, confederate currency, etc., received at the Museum, was subsequently sent to the same office unopened.

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* Chapter 492 of the Laws of 1870.

The contents of the boxes received at the Museum were, with the aid of Mr. M. M. Jones, of the office of the Secretary of State, compared with the catalogue, and having been found to correspond, a certificate to that effect was drawn by the Director and submitted to the Secretary of State.

The specimens have all been ticketed, indicating the "Simms collection," but only a small portion of them have yet been arranged in the cases, and of these a list has been made. The catalogue of the collections remaining at the Museum, when it shall have been revised, will be submitted with a future report.

Acquisition of the Jewett and Emmons Collections.

I have great pleasure in expressing our obligations to Hon. Erastus Corning, whose unremitting interest in the progress of the Museum has been again manifested by securing for the institution the large collection of Fossils and Minerals of Col. E. Jewett of Utica.

The fossils are of great value, being almost entirely from the State of New York, and largely from the Niagara group. Having been obtained at Lockport during the enlargement of the Erie canal, the locality is now inaccessible, and no other field within our State has ever afforded collections of equal interest and importance.

In view of the plan proposed at the University Convocation of last year to distribute collections of fossils and minerals to the academies of the State, I urged the purchase of this collection, as a means of affording a large number of duplicate specimens from localities not easily accessible or yielding as freely as formerly.

At a later period we were again indebted to the kindness of Mr. Corning in securing for the Museum a beautiful collection of Crystals, mainly of New York Minerals, belonging to the late Dr. E. Emmons, and purchased of his family. This collection is partially arranged in the Director's room at the Museum; the one first named, still remaining packed in boxes.

Collections by the Director and Assistants.

The collections made by the Director and Assistants have been very extensive and form a valuable acquisition to the departments of Geology and Palæontology.

The year opened very auspiciously, and during the month of January, 1870, we obtained from Gilboa, in Schoharie county, several of the beautiful trunks of fossil tree-ferns which now occupy a conspicuous position at the east end of the first floor of the Museum.

In a letter to the Secretary of the Board of Regents, on the 29th of January, 1870, I gave some account of what had at that time been accomplished (a copy of which letter for reference is appended). The collections were continued from that date as long as the weather permitted, and the work was resumed in May, Mr. Vandeloo making very extensive collections from the same locality. From the later collections we have parts of several other trunks or bases of these fossil plants (Psaronius), and a large number of fragments of these and other plants, some of which cover slabs of two or three feet in length and breadth. Both in the first and in the later collections we obtained some large slabs of the under clay or plant-bed in which the bases of the trunks rested. The greater part of the smaller vegetation, however, was found imbedded in the strata enveloping the upright trunks and lying above their bases.

The condition of the strata, which are gently dipping to the southeast, leave no doubt that these trees had grown in the position and in the places where they were found.

The material in which the bases were imbedded was originally a soft mud, which in its present condition shows little evidence of lamination ; and this probably formed the substratum of a low level marsh or swamp bordering the ancient sea, or extending seaward from the bolder shores, upon which grew the ancient forest of Psaronius. It would appear that this marsh or forest bed had afterwards been slowly submerged, and the influx of coarser sediment surrounded and enveloped the still standing trunks, while the broken and drifted foliage, together with the remains of other vegetation, had become imbedded in the accumulating sand, silt and clay now constituting the alternating coarser and finer beds of the formation.

The occurrence of these trunks in this undisturbed position, would seem to demonstrate that the eastern shore of the Devonian sea, at the close of the Hamilton epoch, was near the eastern limit of the State of New York, and that the dry land gradually encroaching from the east, here supported a vegetation as luxuriant as that of the coal period. (See note, page 15.)

During the year, the Museum has acquired a large collection of the iron ores of the Lake Superior iron region, in Marquette county, Michigan, representing nearly every mine at present worked in the county.

This acquisition is due to the kindness and liberality of Hon. Samuel J. Tilden, of New York, whom I met in Chicago, in July, when he invited me to accompany him to the iron region, in which he has large interests, and was therefore able to extend to me every facility for exploring and making collections under the most favorable circumstances. My expressions of obligation are likewise due to Hon. William B. Ogden, and to Mr. Ely, the president of the Marquette and Ontonagon railroad; the latter giving free transportation to myself and collections while in the country. My thanks are personally due to Mr. Wetmore, the agent of the New York Mine; to Mr. Isham, superintendent of the Pioneer Furnace; to Mr. Mathews, superintendent of the Jackson Mine; to Mr. Breitung, owner of the Washington Mine, and to many other gentlemen of the iron region.

Major T. B. Brooks, of the geological survey of Michigan, aided me very materially in visiting localities and in securing collections representative of the ores and the rock formations, as well as in freely communicating the results of his observations upon the geological formations.

The collection altogether is very extensive, embracing a pretty complete lithological collection in duplicate of all the rocks of the Huronian system as developed in the Marquètte iron region, and a large series of the iron ores of the different mines, with some of the characteristic rocks associated with them. Many specimens from the New York Mine are finely crystallized and present a beautiful contrast with the usually compact form of the ore. The collection of ores is sufficiently abundant to afford specimens for distribution among such educational institutions as the Regents may please to direct.

There are minor acquisitions to the Museum which I need not enumerate in this place, but which will appear in the schedules accompanying the report.

Field Investigations.

In my report of last year I communicated some observations on the relations of the Oneonta Sandstone to the Hamilton and Chemung groups of New York, and I have given farther attention to this subject during the last summer and fall.

Dr. J. W. Hall and Mr. G. B. Simpson have been temporarily employed as field assistants in tracing the outcrop of this formation, and collecting fossils from it and from the rocks above and below. The result has very clearly demonstrated what I had before suggested, that the rocks in many localities of the south-eastern counties of New York hitherto referred to the Chemung group, with specimens therefrom incorporated in the collections of the museum, do really belong to the Hamilton group, and contain the characteristic fossils of the latter. The difficulties attending the determination of the limits of the formation referred to the Catskill group are still far from being resolved. The suggestion made by some geologists, that the formation probably does not exist within the limits of the State, has, however, been abundantly disproved.

The results of the investigations have given us the limits of the formations, as traced in Otsego, Chenango and the western part of Delaware counties, together with large collections from the Hamilton and Chemung groups, as well as from the Oneonta Sandstone. Of the latter, we had not before a satisfactory collection of authentic specimens in the State Museum.

The investigations have likewise been continued in the south-western counties of the State, and adjacent parts of Pennsylvania, with reference to the relations of some of the conglomerates to the Chemung group, and the overlying Red Sandstone.

In the original collections of the geological survey, some of the conglomerates of the southern counties, containing certain fossils, were referred to and arranged with the Chemung group, while those from other localities but without fossils, were referred to carboniferous age. This latter reference arose from finding some ferruginous beds, supposed to be the outliers of the Red Sandstone of Tioga, near the summits of some of the hills, and below the conglomerates. These have since been proved by their contained fossils to belong to the Chemung group, and it has not yet been demonstrated, that the Red Sandstone of the adjacent part of Pennsylvania, does occur within the limits of the south-western counties of New York.

To a very great extent, the conglomerates have been ascertained to belong to the Chemung group, and to contain numerous characteristic fossils of the formation, while in some localities, at least two hundred feet of shales and shaly sandstones, charged with Chemung fossils, lie above the conglomerate. So many localities have now been examined, that we may conclude that all the conglomerates of the southern counties are of the age of the Chemung,* but, from the great difference in character of the fossils in different localities, it may not be regarded as proven that these beds are all of the same horizon. Thus far, we have failed to trace the extension of these conglomerate beds to the eastward of Alleghany county.† From some of these localities, I have made large collections during the past year, and Mr. Vandeloo, under my direction, has made still more extensive collections from the same, and from other localities in the southern counties of the State.

These investigations, in the entire southern part of the State, show the great need of a revision of the Geological Map of the State: indeed, it has long been known that the limits of formations, as laid down on that map, are, in many instances, quite erroneous, and I am sure we could render no more acceptable service to the science, or do anything better adapted to meet the wants of our intelligent teachers and students, than the preparation of a new and more accurate geological map of the State. The work already accomplished is but a beginning, and I would very earnestly recommend that authority be given me to continue these investigations as far as practicable with the means at our command, with a view to the completion of such a map as I have suggested, and one which, when published in a proper form, might find its way into every school, academy and college within the State, and become the source of valuable, practical knowledge.

General Work of the Museum.

Heretofore the collections in each of the departments have been indicated only by the label of generic and specific names among the natural history objects, and by the simple names among rocks and minerals. In order to give more general information, and at the same time a view of the classification of the objects in the museum, another series of labels has been added. These are large paper labels, covered with glass to prevent the rapid soiling of exposed paper surfaces. The geological wall-labels have been arranged over the wall cases of the first floor, indicating the geological systems and subordinate formations. On the second floor, similar labels have been placed over the cases, designating the New York Minerals and the classes to which they pertain, and over the mammalian fossil remains, indicating their respective faunæ and continental distribution.

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* The relations of some of the outlying conglomerates south of Olean in New York, and the adjacent parts of Pennsylvania in McKean county, to the Chemung group and Coal measures, have not yet been satisfactorily determined.

† Some thin interrupted layers of conglomerate are known in the more eastern counties, but it cannot be demonstrated that these beds hold the same relative position as those of Alleghany, Cattaraugus and Chautauqua counties.

On the third floor the recent faunæ are designated in like manner, with sub-kingdom and class — the "New York fauna" occupying a separate part of the hall, and thus indicated, giving students a ready means of reference to that part of the collection.

These general labels will greatly facilitate the student in his study of the collections, and, to the amateur or general visitor, they afford the means of locating and referring the objects in the different cases, by the single, conspicuous label at the head.

The lithological series of the New York rocks from the Laurentian to the Catskill Sandstone inclusive, occupying the table cases, has been labeled by Mr. Lintner, under the supervision of the Director. The label indicates the character of the rock, the contained fossils, if any; the locality, and the formation to which it belongs. Those specimens which formed a part of the original collections of the Geological Survey, and are enumerated in the catalogue of the State Cabinet published in 1853, are specially indicated by the label.

There have been added to this series from the collections during the past year, sixty specimens from the Huronian system, thirty specimens from the Catskill Sandstone, and also specimens of the New Red Sandstone from the Rocky mountains.

In order to complete a representation of the series between the Catskill Sandstone and the Coal measures, collections have been arranged in the cases, representing the most characteristic fossils and specimens of rock formations of the Waverly Sandstone, Burlington Limestone, Keokuk Limestone, and Chester Limestone. Since the Museum did not possess collections sufficient for this purpose, the deficiency has been supplied by selections from the private cabinet of the Director, which have been temporarily deposited in the cases, and indicated by a proper label. A list of these will be found under the additions to the geological department "by deposit."

In the lithological series, both in the table and wall cases, the entire collection of Huronian rocks has been added during the year. The investigations in the south-eastern part of the State has shown the necessity of an entire revision of this series, so far as relates to the Hamilton and Chemung groups. This has already been done for the table cases, and has been commenced for the wall cases, and all specimens of doubtful or questionable authenticity, will be rejected and replaced by others from authentic localities.

The Cretaceous and Tertiary collections from the Rocky mountains, Wyoming and Nebraska, from New Jersey, Georgia, Alabama, Texas and Mississippi, which had hitherto occupied drawers, have been arranged in some old table cases, temporarily placed for that purpose upon the second floor of the museum.

The collection of type specimens of Tertiary fossils from the valley of the Amazon, purchased of Prof. James Orton, has been placed in one of these cases, with the proper label attached. A list of the specimens will be found appended.

On the third floor, the collection of mounted fishes and of skulls, has been properly labeled, and a classified catalogue of the former, in accordance with the system of Prof. Gill, prepared by Mr. Lintner, in which reference is made to the descriptions and figures of the species in the *Zoölogy of New York.* A catalogue of the fishes will be given in this report.

In the Palæontological series, Mr. Whitfield has arranged and labeled a collection of fossils from the Potsdam Sandstone of Keesville, and a few from the falls of St. Croix. He has also placed in the cases a labeled collection of Waldron fossils, of the Niagara group, amounting to two hundred and seventy specimens, and has mounted on new cards and properly labeled the greater part of the New York Brachiopoda. A large portion of the series above the Niagara group was rearranged, in order to give space for the Brachiopoda of the Oriskany Sandstone and those of the Hamilton group, and a number of fossils which had been allowed to remain in these collections from the old arrangement, on critical examination, it was found necessary to exclude.

In the Chemung group, a collection of Brachiopoda of over three hundred specimens from Rockford, Iowa, has been placed in the cases and labels written for the species. The Ichthyic remains of this group have also been arranged in small trays in the cases, preparatory to their permanent disposition.

The work of arranging and labeling the Carboniferous collections in the geological series and the Cretaceous and Tertiary fossils on the second floor, has been done by Mr. Whitfield. He has likewise been engaged in the general work on the collections of the Hamilton and Chemung groups, preparatory to their transfer to the cases, and in labeling and packing several small collections for the academies.

Few additions have been made to that portion of the Economic collection displayed in the hall, the space devoted to it being so occupied as not to warrant the solicitation of additional contributions. Through some changes recently introduced in the hall, some additional shelving has been provided for the specimens, permitting of a partial rearrangement of the collection. The marbles have been brought together and the limestones have been placed in the order of their formations. Each block in the collection has been permanently marked with a number in red, referring to the list in the Director's Report on Building Stones, published in 1868, and to a supplementary list hereafter to be kept of subsequent additions. The numbers at present extend to one hundred and sixteen; but as a few are indicated by letters, the entire number is one hundred and twenty-three, exclusive of several rough blocks which have not been enumerated.

A portion of the collection of the late Prof. Pickett, of Rochester, has been unpacked, examined and ticketed as the "PICKETT COLL." Some of the fossil corals have been labeled and placed in their appropriate cases.

I have, in the preceding annual reports on the condition of the Museum, called your attention to the necessity of additional cases for the proper arrangement and display of collections which lie packed in boxes or drawers. Some of these are donations from the Smithsonian Institution, others from individuals, and a large part derived from the collections of the Director and Assistants, or by purchases made by the authority of the Regents or of the Legislature. The institution and the persons connected therewith are sufferers by the continuation of this state of things, and it has become quite impossible to show the evidences of work actually done in the several departments. On the present occasion, I propose to make a separate communication in reference to the cases now actually required for the arrangement and preservation of the collections.

In conclusion, I would say that the collections in all the departments are in a good condition and systematically arranged, and I would ask that the Regents, in a body or by a committee, should visit the Museum and make a critical examination. In the statement above made of work done, there are many things which cannot be enumerated, and much time of the Director and Assistants is taken up in replying to the questions of visitors or giving information to persons interested in mines or minerals. I believe, however, that with the means at our disposal, as much work has been accomplished as could be expected, and that in this respect we may safely challenge comparison with any other similar institution of our country.

I am, very respectfully,
Your obedient servant,
JAMES HALL.

ALBANY, *January* 10, 1871.

NOTE.—The Gilboa collections, noticed on page 8, having been submitted to Prof. Dawson, of Montreal, for examination, he has determined the fossil trunks to be of two species, which he has named *Psaronius Erianus* and *Psaronius textilis*. Among the other plant remains he finds three species, which he designates as *Rachiopteris gigantea*, *Rachiopteris palmata* and *Nœggerathia Gilboensis*.

(*From the Albany Argus of January* 30, 1870.)

THE SCHOHARIE FOSSILS.—LETTER OF DR. HALL.

ALBANY, *January* 29*th*, 1870.

DR. S. B. WOOLWORTH, *Secretary of the Board of Regents:*

Dear Sir—Some weeks since a letter from Mr. D. Mackey, of Gilboa, informed me that, while blasting rocks in that place, the workmen had discovered the base of a large tree of peculiar character standing erect in the rocky strata, and that himself and other persons in the town were desirous that the specimen should be secured for the State Cabinet. By my direction, Mr. Lintner visited the place and brought away some fragments of the trunk and two specimens of stems or trunks of a different kind. At the same time he obtained a promise that the larger of two trunks then obtained should be reserved for the State Cabinet. Some notice of these specimens was given at a meeting of the Albany Institute on the 18th instant.

I have, since that time, visited the locality and examined the geological relations of these fossil trees. I have brought down to the Museum three of these trunks, one, the specimen first discovered and reserved for the Cabinet, another larger one with a nearly complete base, though much broken in the upper part, and another smaller one in which the base is not preserved. In the first one the spreading base is not entire, though I think it may probably still remain in the rock where the trunk originally stood, the place being now covered with debris. This one is nearly a foot in diameter at a point two feet above the base. The large specimen preserves the base nearly entire for three-fourths of its circumference, and is three feet in diameter. The trunk at the height of two feet is eighteen inches in diameter. The smaller one is broken off above the base, preserving about two feet in length, and is somewhat flattened, the diameters at top being respectively seven inches and eight inches. The exterior surface of these trunks is irregularly rugose, but without any regular or defined markings. The interior, to the depth of one or two inches, is coarsely reticulate, with the meshes extremely elongate in the longitudinal direction of the trunk. The three trunks, together with other specimens collected, including boxes and packing material, weighed 2,662 pounds; the larger trunk is probably not much less than one thousand pounds in weight.

There is one other similar base and trunk preserved, and a fifth small one was broken up among the rocks thrown out, as appears from the impression left in the matrix, as well as from some fragments which I was able to obtain from a portion of the base still remaining in the rock. There are, therefore, five of these trunks known to have been found in this locality. They were standing vertically or slightly inclined in the stratum of rock, and three of them, the largest and the two smaller ones, were nearly in a line from north-west to south-east, and within the distance of twelve feet; the large one in the center. Of the other two, one was found at the distance of forty or fifty feet to the westward, and the other, some thirty or forty feet further in the same direction.

These trunks were all found at the same horizon, with the bases resting upon a soft shaly stratum, the beds dipping to the south-west. The rocks are of the age of the Hamilton group, and several hundred feet below the top of the formation.

Several years since, a part of a similar trunk—the base, as I am informed—was found in the bed of the Schoharie, near Gilboa, and was for some time in the possession of the Rev. Mr. Lockwood, of Keyport, New Jersey; it is now, I believe, in the collection of Dr. J. S. Newberry.*

At the meeting of the Institute, I suggested that these trunks might belong to the genus Sagenaria; but further examination leads me to doubt this relation.

I regard these specimens as possessing a great interest in a scientific point of view, and they are a very valuable acquisition to the collections of the Museum. We have been indebted to the good will of Mr. Mackey, Dr. Layman, Mr. Baldwin and Mr. Stryker, in securing them.

Besides these trunks, there are numerous other specimens of plant remains in the rocks, and I have considered it my duty to send one of my assistants to the locality to take advantage of the occasion for securing everything which may be obtained during the progress of the work.

I am, very respectfully,
Your obedient servant,
JAMES HALL.

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* [Since the writing of this letter, I have seen the original specimen here referred to, which is in the Museum of Rutgers College, New Brunswick; it is larger than any other yet obtained. The specimens which I have seen in Dr. Newberry's collections are of other and smaller individuals.]

ADDITIONS TO THE STATE MUSEUM DURING THE YEAR 1870.

I. TO THE ZOÖLOGICAL DEPARTMENT.

I. By Donation.

From the Smithsonian Institution.

Nine Birds' eggs of six species, as follows:

Lagopus rupestris Leach. White Ptarmagin. (Two spec.)
Bernicla Hutchinsii Baird. White-cheeked Goose. (Two spec.)
Somateria v-nigra Gray. Eider Duck.
Somateria spectabilis Leach. Pacific Eider. (Two spec.)
Podiceps griseigana Gray. Red-throated Diver.
Podiceps occidentalis Lawr. Cooper's Grebe.

From James W. Lynn, Long Island.

Two perfect crusts of *Polyphemus occidentalis* (Horse-foot Crab), from Northpoint, L. I.

From Col. Richard J. Dodge, U. S. A.

Skin of *Cervus macrotis* Say (Black-tailed Deer); two skins of *Canis latrans* (Prairie Wolf), and two of *Cynomys Ludovicianus* (Prairie Dog). Fort Lyon, Colorado.

From Miss M. M. Skerritt, Albany.

A specimen of *Vespertilio subulatus* Say (Little Brown Bat.)

From Verplanck Colvin, Albany.

A young specimen of *Chlorosoma vernalis* B. & G. (Green snake), taken from the cellar of his residence.

From Miss E. Bailey, Albany.

Larvæ of *Lagoa crispata* Packard, collected at New Baltimore.

From J. Irwin Mackey, Albany.

A specimen of Madrepora, collected at Darien, Georgia, to which place it had probably been brought from the Gulf of Mexico.

From Hon. B. B. Bignell, Oswego, Tioga Co.

A Centipede of an unknown species, bearing two pairs of long legs on each segment: captured in Stanwix Hall, Albany, where it is supposed to have been brought in baggage from the South, or some foreign country. Two of the same species have been previously taken in this city, under conditions rendering their importation probable.

From Daniel Merville, South Columbia, Herkimer Co.

A small collection of Freshwater Shells (21 individuals), and a number of *Succinea obliqua* Say, as follows:

Unio radiatus Lam., two.
Unio complanatus Lea., four.
Alasmodon undulata Say, five.
Alasmodon emarginata, three.
Anodonta fluviatilis Lea., one.
Anodonta subcylindracea Lea., two.
Physa heterostropha Say, four.

II. By Exchange.

The following specimens of Shells were received from Wm. Newcomb, M. D., of Ithaca, N. Y., in exchange for duplicates from the Museum collections:

Parapholas Californica Conrad	Monteray, Cal	1
Harvella elegans Sby. (rare)	Old Panama	1
Lævicardium Elenense Sby. (dredged)	Panama	3
Cardium ob-ovale Brod. and Sby	Panama	3
Cardium graniferum Brod. (dredged).	Panama	3
Corbula nuciformis Sby	Panama	2
Corbula bicarinata Hinds	Panama	3
Venus Cypria Sby. (dredged)	Bay of Panama	3
Adrana Conradi Newcomb MS.	Navy Bay	3
Purpura melones Duclos (very fine)	Panama	1
Monoceros cingulifera Sby	Panama	2
Littorina Newcombiana var. Soulet	Sandwich Islands	4

III. By Purchase.

Twenty-three mounted Skeletons and one Skull. Those marked with an asterisk are understood to be of the collections made for the Museum by Mr. Kislingbury.

Mammalia.

**Ursus Americanus* Harl. (Black Bear), young.
**Mustela Canadensis* Linn. (Fisher), male and female.
**Castor fiber* Linn. (Beaver), male and female.
**Mustela Americana* Turton. (Pine Marten), male and female.
**Hystrix Hudsonius* Richardson. (N. A. Porcupine).
**Procyon lotor* Harlan. (Raccoon), male and female.
Putorius pusillus Aud. and Bach. (Lesser Weasel), male.
Sciurus niger Say. (Black Squirrel), male.

Aves.

Haliætus leucocephalus Linn. (Bald Eagle), female.
Rallus Virginianus Linn. (Mud Hen). Irondequoit Bay.
Anas discors Linn. (Blue-winged Teal). Irondequoit Bay.
Fulica Americana Gmelin (American Coot). Irondequoit Bay.

Pisces.

Catostomus aureolus Lesueur. (Mullet Sucker). Lake Ontario.
Pimelodus catus. (Common Catfish). Lake Ontario.
Corvina oscula (Kirtland). Lake Sheepshead. Lake Ontario.
Lucioperca Americana Cuv. et Val. (Yellow Pike Perch).

Reptilia.

Emys picta Holb. (Painted Tortoise). Irondequoit Bay.
Chelonura serpentina Say. (Snapping Turtle), male. Monroe Co.
Bufo Americanus Le Conte. (Common American Toad).

II. TO THE BOTANICAL DEPARTMENT.

I. By Donation.

From W. H. Leggett, New York.

Specimens of sixty species of Phænogamous Plants, of which several are new to the State.

From C. S. Osborn, Rochester.

Specimens of thirty-two species of Plants, some of them very fine.

From C. S. Austin, Closter, N. J.

Specimens of four species of Lichens, new to the State.

From Miss Mary L. Wilson, Buffalo.

Specimens of twenty-two species of Lichens, several of which are additions to the Flora of the State.

From Miss Sarah P. Monk, Poughkeepsie.

A specimen of *Polypodium vulgare* var. *Cambricum* L.

From S. N. Cowles, Otisco, N. Y.

Specimens of *Carex capillaris* L., — an interesting addition to the Flora of the State.

From W. R. Gerard, Poughkeepsie.

Specimens of eight species of Fungi, of which one is undescribed.

From E. L. Hankenson, Newark, N. Y.

Specimens of seven species of Flowering Plants.

From G. B. Brainerd, Brooklyn.

Many specimens of *Juncus maritimus* Lam.

From E. C. Howe, M. D., New Baltimore.

Specimens of twelve species of Plants nearly all new to the State.

From R. Prescott, Albany.

A specimen of *Sphæropsis anomala* Pk., a new and interesting Fungus.

From F. B. Cornwell, Vallejo, Cal.

A specimen of *Lecanora ventosa* Ach.

From J. S. Merriam, New York.

Specimens of three species of Flowering Plants, of which two are new to the State.

From B. D. Gilbert, Utica.

Beautiful specimens of two Ferns from China.

From S. T. Olney, Providence, R. I.

Specimens of five species of rare Carices.

From H. Gillman, Detroit, Mich.

Specimens of three species of Lemnaceæ.

From M. S. Bebb, Fountaindale, Ill.

Specimens of five species of western Plants.

From Rev. H. A. Riley, Montrose, Pa.

Specimens of the very rare, white-flowered *Verbascum Thapsus* L.

From S. B. Woolworth, LL.D., Albany.

Specimens of five species of Flowering Plants from Colorado.

From Hon. A. S. Johnson, Utica.

Specimens of *Agaricus bombycinus* Schæff., and *Lycoperdon cyathiformis* Bosc.

From Hon. G. W. Clinton, Buffalo.

Specimens of sixty species, mostly Fungi, and several new to science.

From C. Devol, M. D., Albany.

A piece of the wood of one of the mammoth trees of California (*Sequoia gigantea*), which measured "one hundred feet in circumference, four hundred and fifty feet in height, and was two thousand years old."

From G. W. Pine, Herkimer, N. Y.

Bark, Cone and Leaves of *Sequoia gigantea* Decaisne, California.

II. By Collection.

By the Botanist.

Three hundred and one species of Plants, of which two hundred and ninety-nine are new to the State, and eighty-seven are new to science.

III. TO THE GEOLOGICAL AND MINERALOGICAL DEPARTMENT.

I. By Donation.

From W. L. Baldwin, Gilboa, N. Y.

Two fine specimens of Fossil Plants of the Hamilton Group.

From W. S. LAYMAN, M. D., Gilboa, N. Y.

Specimen of cemented Gravel and calcareous Spar, from a fissure in the rocks of the Hamilton Group.

From F. E. ASPINWALL, Loudonville, N. Y.

A piece of Talcose Slate, containing fine octohedral crystals of magnetic iron.

From FRANK PRUYN, Albany, N. Y.

Limestone from the Hudson River Group at Watervliet Mills, containing *Orthis pectinella* Conrad, and other fossils.

From B. F. SMITH, Jr., Alabaster, Mich.

Four blocks of Gypsum, of about a cubic foot each, and several smaller specimens, from different beds of the quarries at Alabaster, Alabaster Bay, Lake Huron, Michigan.

From JOHN P. DEAN, Deposit, N. Y.

A specimen of Lepidodendron from Sanford, Broome Co., N. Y.

From JOHN J. SMITH, Tribes Hill, N. Y.

Black River Limestone, containing *Columnaria alveolata* Goldf., from Tribes Hill.

From O. W. MORRIS, New York.

Specimens of *Pentremites godoni*, picked up at Niagara Falls.

From DANIEL CHURCH, Gouverneur, N. Y.

Serpentines and Limestones, from Gouverneur, N. Y.

From ASEL F. WILCOX, Fayetteville, N. Y.

Two large blocks of Gypsum, one showing wearing from dripping water; and a specimen of Hydraulic Limestone. Fayetteville.

From GEORGE W. PINE, Herkimer, N. Y.

Sulphuret of Silver, with accompanying piece of the metal extracted. Washington Dist., Reese River, Cal.

Silver Ore, yielding $200 per ton; locality as above.

Oxidized Galena Silver Ore, yielding $300 per ton. Washington Dist., Nevada.

Galena Silver Ore, with accompanying specimen of extracted lead and silver. Humboldt, Nevada.

Galena Silver Ore. Idaho.

Silver Ore yielding $350 per ton. Austin, Nevada.

Copper Silver Ore, $250 per ton; two specimens. Aurora, Nevada.

Silver Ore. Carter Dist., Nevada.

Gold-bearing Quartz. Grass Valley, Cal.

Smelted Silver Ore. Austin, Nevada.

Copper Silver Ore. Panagar Dist., Nevada.

Galena. Santa Fe, New Mexico.

Copper Ore. Copperopolis, Cal.

Bitumen. California.

Tufa, from extinct volcano. Middle Park, Cal.

Calcareous Tufa, from Boiling Spring, Humboldt Co., Nevada.

Agate. Fort Bridger, Rocky Mts.

Obsidian. Glass Mt., Esmaraldo Co., Nevada; two spec.

From Hon. Alex. S. Johnson, Utica, N. Y.

Specimens of Orthoceratites in Utica Slate.

Six specimens of *Triarthrus Beckii* Green and six of *Trematis filosa* Hall, in Utica Slate.

Numerous specimens of Coal-plants and Rock specimens, from Morris Run, Penn.

From Jacob Vroman, Schoharie, N. Y.

Waterlime, containing fine crystals of calcareous spar, from quarries at Howe's Cave.

From Dayton Ball, Albany, N. Y.

Cryolite, from Greenland; procured by the Pennsylvania Salt Co., at Natrona, West Penn.

From John M. Scribner, Middleburgh, N. Y.

A specimen of *Grammysia magna* Hall, from the sandstones of the upper Hamilton beds of his quarries.

From Charles Van Benthuysen, Albany, N. Y.

Four Coal-plants (*Sigillaria*, *Lepidodendron*, etc.), from Scranton, Pa.

From A. Hermance, North Chatham, N. Y.

Massive Quartz with crystals attached, from the farm of P. Hapeneau, Red Hook, N. Y.

From J. Van Horne, Auriesville, Montgomery Co., N. Y.

Indurated Bitumen, occurring in the Calciferous Sandstone, with associated quartz crystals.

From H. G. Sage.

Specimen of Medina Sandstone (fine grit), from the farm of D. E. Fay, Fulton, Oswego Co., N. Y.

From Hon. S. M. Weed, Plattsburgh, N. Y.

A mass of magnetic Iron Ore.

From Enoch Carter, Newburgh, N. Y.

A portion of a Plant-stem (Lepidodendron), twelve by two inches, taken from a locality at Newburgh where coal is being quarried for. Communicated by W. C. H. Sherman, of Newburgh.

From H. S. Reed & Co., Corning, N. Y.

A piece of Sandstone, slightly calcareous, with polished surface; from the Chemung Group at Corning.

From S. E. Mayo, Albany.

Specimens of Dolomitic Limestone, from Lawrence, Kansas, now being quarried for the State University building.

From H. & R. Jones, Prospect, N. Y.

A twelve-inch cube of Limestone (No. 95) of the Trenton Group, showing various styles of dressing. (This block was received in 1869, but unaccompanied by the name of the donors.)

From Hon. Ezra Cornell, Ithaca, N. Y.

A slab of Sandstone (26 × 36 inches) from the Chemung group at Ithaca, with its surface covered with *Spirifera Verneuili* Murch.

II. By Exchange.

From BENJ. W. SMITH, Lexington, Ky.

Nineteen specimens of Fossils, principally from Fayette Co., Ky., labeled, as follows, by Mr. Smith :

Atrypa modesta Hall.
Favosites fibrosa? Cobb.
Chætetes ——? Hall.
Chætetes lycoperdon? Hall.
Cyclonema bilix? Conr.
Murchisonia bicincta Hall.
Murchisonia bellicincta Hall.
Pleurotomaria rotuloides Hall.
Ambonychia amygdalina Hall.
Ambonychia radiata Hall.
Orthis occidentalis Hall.
Orthis subjugata Hall.
Orthis lynx (Eichw.)
Orthis testudinaria Dalman.
Favistella stellata Hall.
Leptæna alternata Conr.
Modiolopsis modiolaris ? Conr.
Rhynchonella altilis Hall.
Tentaculites flexuosa Hall.
Also, Carbonate of Lime, from the Mammoth Cave, Ky., and Sulphate of Strontian, from Nashville, Tenn.

III. By Collection.

By the DIRECTOR.

An extensive suite of Rock specimens from Marquette Co., Mich., illustrative of the HURONIAN SYSTEM, of which the following are placed in the table-cases of the Geological Series :

Diorite,
Diorite with Slate,
Quartzite,
Feldspathic Rock,
Slaty Quartzite,
Brown Slate,
Micaceous Iron Ore,
Suphuret of Iron,
Chloritic Slate,
Feldspar with chloritic Slate,
Slaty Hornblende Rock,
Silicious Limestone,
Chloritic Slate with veins of Spar,
Specular Iron Ore.

The following are deposited in the wall-cases of the same series :

Specular Iron Ore. N. Y. Mine, Neguanee, Mich.; eight spec.
Silver Lead Ore. Marquette.
Talcose Slate. Washington Mine, Marquette.
Sandstone. Below Marquette.
Slaty Quartzite. Light House Point.
Feldspathic Rock. Dead River, Mich.; three spec.
Silicious Limestone. Below Marquette.

Silicious Limestone, with veins of spar. Light House Point.
Chloritic Slate. Dead River.

A block of Silicious Iron Ore striped with red jasper, weighing about four hundred pounds: placed for the present in the out-door collection. Marquette Co.

Compact and crystallized Iron Ore, representing the principal mines of the Marquette iron region, with the associated Rocks: many duplicate specimens of the same.

Specimens of all the varieties of Rock representing the geology of the Lake Superior iron region; also a large number of duplicates.

A collection of Rocks and Fossils from the Rocky mountains, referred to in the preceding report, but which had not then been arranged in the Museum.

Specimens of fine Clays, showing glazed surface, with imprints of rain-drops. Rocky mountains.

Titaniferous Iron Ore. Westport, Essex Co., N. Y.

Crystallized Magnetic Iron Ore, from the new bed at Moriah, N. Y.

Crystals of Magnetic Oxyd of Iron, from the same locality.

Smoky Quartz, from the old bed at Moriah, N. Y.

Quartz, Calcareous Spar and Iron, from the old bed at Moriah.

Smoky Quartz and Iron Ore, " "

Quartz, coated with Calcareous Spar, " "

Three fossil trunks of Tree-ferns (*Psaronius Erianus* Dawson). Gilboa, Schoharie county, N. Y.

Slabs of the Plant-bed from beneath the Psaronius containing its rootlets.

Specimens from the strata surrounding the trunks, with remains of branches and other vegetation.

By the ASSISTANTS.

Several parts of trunks of *Psaronius Erianus* Dawson.

Large masses of the Psaronius Plant-bed.

Two flattened pieces of Psaronius, taken from the beds surrounding the bases of the trunks, and supposed to be the upper portions of the trunks, which had been broken off and imbedded during the progress of the deposition; the larger specimen is three feet in length, and measures ten and thirteen inches in circumference at its ends. Gilboa, N. Y.

A large collection of *Lycopodites Vanuxemi* Dawson, from the

Portage group at Ithaca, N. Y.; some of the specimens with a species of Rhynchonella attached to the stems.

One or more species of Dithyrocaris and many other fossils, from the same beds at Ithaca.

Collections from the Chemung group at Ithaca.

Fossils of the Chemung Group in the neighborhood of Elmira and Chemung Narrows, Chemung Co., and at Panama in Chautauqua county.

Fossils of the Old Red Sandstone, near Blossburg, Pa.

Fossils of the Cauda-Galli Grit, from the Helderberg mountains. Collected by Mr. Vandeloo.

Large collections of fossils from the Hamilton and Chemung groups, in Otsego, Chenango, Broome and Cortland counties; and of the Red Sandstones, from Otsego, Chenango and Delaware counties. Collected by Dr. J. W. Hall and George B. Simpson, Field Assistants.

Glacial Scratches, from extensive beds of polished Tentaculite Limestone, uncovered in quarrying for the new Hudson River bridge at Albany. Schoharie, N. Y. Collected by Mr. Lintner.

IV. By Purchase.

Type specimens of Tertiary Shells from the valley of the Amazon, discovered and collected by Prof. James Orton, and described by F. A. Conrad; of the following species:

Dyris gracilis Conrad, two,
Liris laqueata, Conr., four,
Isæa lintea Conr., two,
Isæa Ortoni Gabb, four,
Isæa Ortoni (young), ten,
Ebora crassilabra Conr., two,
Ebora bella, Conr., one,
Pachydon erectus Conr., one,
Pachydon obliquus Conr., seven,
Pachydon tenuis Conr., one,
Pachydon ovatus Conr., one,
Pachydon cuneatus Conr., four,
Pachydon cuneatus (young), one,
Anisatyra carinatum Conr., five,
Hemisinus sulcatus Conr., one,
Neritina Ortoni Conr., fifteen.

Two parts of valves allied to Mulleria.

A piece of the indurated, fossiliferous Clay from the shell deposit.

Fossils and rock specimens of the "Simms Collection," enumerated under one hundred and eighty-two numbers of the printed catalogue, and additional manuscript numbers extending to two hundred and four.

Minerals, enumerated in three hundred and seventy-nine numbers of the printed catalogue, and in additional manuscript numbers to four hundred and ten. Among them are some beautiful stalactitic and stalagmitic formations from Ball's Cave in Schoharie county.

V. By Deposit.

By the Director.

Seventy-five specimens, representing the Waverley sandstone series of Ohio, the supposed equivalents of the same at Burlington, Iowa, and the Burlington beds of the Lower Carboniferous Limestone of Burlington, Iowa. (The specimens are marked with carmine tickets bearing the name "Hall," and are numbered from 1 to 75 inclusive, as follows):

From 1 to 11, Specimens from the Waverley Sandstone Series of Ohio.
12 to 23, Specimens from Burlington, Iowa — sandstones, etc.
24 to 42, Actinocrinus, of Burlington Limestone.
43 to 48, Pentremite, etc., " "
49 to 56, Other forms from " "
57 to 72, Other fossils from " "
73 to 75, Geological specimens, " "

IV. TO THE DEPARTMENT OF ARCHÆOLOGY AND ETHNOLOGY.

I. By Donation.

From F. E. Aspinwall, Loudonville, Albany Co.

A collection of forty Indian Arrow-heads, and other Indian antiquities.

From J. H. Kasten, Fort Hunter, N. Y.

Relics collected at Fort Hunter, N. Y.

From Isaac De Forest, Fort Hunter, N. Y.

Bullets, buttons and other relics from Fort Hunter.

From James Sinclair, Meredith, N. Y.

A Horn Spoon made in Scotland over a century ago.

II. By Purchase.

Articles from the "Antiquarian Department" of the "Simms Collection," catalogued under two hundred and thirty-six printed and manuscript numbers. Of these some have been transferred to other departments, and others will probably be deposited in the State Library and in the Hall of Military Records.

III. By Deposit.

By the ALBANY INSTITUTE.

The "POMPEY STONE."

This stone, which has enlisted much speculation, was found in the town of Pompey, Onondaga county, in 1820 or 1821. In *Schoolcraft's Notes on the Iroquois*, a representation is given of "The Antique Stone of Manlius," with the following notice of it.

> "The stone is about fourteen inches by twelve, and eight inches in thickness. It is a hard, oval-shaped boulder, of a gneissoid character, and bears the evidence of attrition common to all the 'erratic block group.' By the figure of a serpent climbing a tree, a well known passage in the Pentateuch is clearly referred to. By the date, the sixth year of the reign of the Roman pontiff, Leo X, has been thought to be denoted. This appears to be probable, less clearly from the inscriptive phrase, Leo de Lon VI, than from the plain date 1520, being six years after this pontiff took the papal chair."

The engraving above referred to is as follows: On the center of the stone, rather rudely represented, a tree with a serpent climbing it; to the left of the tree, the words LEO DE, beneath which are the figures VI 1520; to the right of the tree the word LON, in range and probably in continuation of LEO DE,—and opposite to the figures, two cross-lines forming a large X; below the outer foot of the X is a triangular figure with two lines nearly crossing it.

> "The stone was found with the inscription downward, about one-third buried. It was subsequently removed to Manlius village. * * * * * It remained in this village nearly a year, and was finally deposited in the museum of the Albany Institute."
>
> "It may be thought that the name De Leon is intended by the words De Lon. The date, VI, would tally exactly with the sixth year after his landing in and discovery of Florida in 1512; the Onondaga country being then as much a part of Florida as any other part of the Atlantic and interior coasts. If, by the prefix of Leo or Lion, a compliment to a brave and hardy explorer was designed to have been expressed, it would have well corresponded with the chivalric character of the age."

In order to afford to the public better facilities for the inspection of this interesting relic, it was deemed proper by the members of the Albany Institute to deposit it in the State Cabinet, the following receipt being taken upon its delivery:

"In accordance with a resolution of the Albany Institute, adopted at a regular meeting held on the 18th day of January, 1870, the undersigned, in behalf of the trustees and officers of the New York State Cabinet of Natural History, hereby acknowledge the receipt, on deposit, of a boulder found many years since in the county of Onondaga in this State, and bearing an ancient inscription, subject to the further order of the Albany Institute.

(Signed) S. B. WOOLWORTH,
Secretary of the Regents of the University,
(ex-officio Trustees of the State Cabinet),
JAMES HALL,
Curator of the State Cabinet of Natural History.

Albany, *Feb.* 16, 1870."

V. TO THE LIBRARY.

I. By Donation.

From Horace Capron, Commis. Depart. Agricul.

Report of the Commissioner of Agriculture for the year 1868. Washington, 1869.

From The Society.

Sitzungs-Berichte der naturwissenschaftlichen Gesellchaft Isis in Dresden. Nos. 4–12, 1869. Nos. 1–6, 1870.

From T. L. Harison, Sec'y N. Y. S. Agricul. Society.

Eleventh Annual Report of the Indiana State Board of Agriculture, and the Report of Professor E. T. Cox, State Geologist.

From the Societe Imperiale, etc.

Memoirs de la Société Impériale des Sciences Naturelles de Cherbourg. Tome xiv, Paris, 1869. Pamph., 8vo.

From the Trustees of the New York State Library.

Forty-seventh, Forty-eighth, Forty-ninth and Fifty-second Annual Reports of the Trustees of the New York State Library. Albany, 1865, 1866, 1867 and 1870. Pamphlets, 8vo.

From the Author.

Alphabetical Catalogue of Type Specimens of Fossil Fishes, in the collection of Sir Philips de Malpas Grey Egerton, Bart., M. P., at Oulton Park. Pamph., 8vo., 1869.

From Prof. James Orton, Vassar College.

Descriptions of New Fossil Shells of the Upper Amazon. By T. A. Conrad. (From the American Jour. of Conchology. Published in advance. Oct. 10, 1870.)

From Det Kongelige Norske Universitet i Christiania.

Norges Fugle, og deres geographiske Udbredelse i Landet, af Robert Collett. (Forhandlinger for 1868.) 8vo. pp. 80.

Om individuelle Variationer hos Rorhvalerne og de deraf betingede Uligheder i den ydre og indre Bygning af G. O. Sars. (Forhandlinger for 1868.) Pamph., 8vo. pp. 46.

Fortsatte Bemærkninger over det dyriske Livs Udbredning i Havets Dybder, af M. Sars. (Forhandlinger for 1868.) Pamph., 8vo. pp. 32.)

Le Glacier de Boium en Juillet 1868, par S. A. Sexe. Christiania, 1869. Quarto, Pamph., pp. 40.

From Prof. James Hall, LL.D.

Geological History of the North American Continent. A Lecture delivered before the American Institute, in New York, by Prof. James Hall, Albany, 1869. Pamph., 8vo. pp. 24.

II. By Subscription.

The American Naturalist. Salem, Mass., 1870. Vol. III, Nos. 11, 12. Vol. IV, Nos. 1–10.

The American Entomologist. St. Louis, 1870. Vol. II, Nos. 3–12.

The American Journal of Science and Art. New Haven, 1870. Vol. XLVII, No. 140. Vols. XLIX and L.

United States Railroad and Mining Register. Philadelphia, 1869, 1870. Vol. XIV. Vol. XV, Nos. 1–23, 25–31.

III. By Purchase.

A System of Mineralogy. Descriptive Mineralogy, comprising the most recent discoveries. By James Dwight Dana. New York, 1870. 8vo.

VI. MISCELLANEOUS.

From Rev. Wm. Stone Hayward, Morley, St. Lawrence Co.

Specimens illustrating the action of lightning on a tree and rocks adjacent. (The following communication, cut from the N. Y. Journal of Commerce, accompanied the contribution.)

To the Editor of the Journal of Commerce:

On the night of the 27th of July last, at 11 o'clock, a tree was struck by lightning, in Sodus, Wayne county, of this State, and such power as was displayed deserves notice. The tree was a white ash, about forty feet high, and a foot in diameter. The top was rent into three main parts, and these were thrown with the top inward, forming a figure resembling the obtuse angle of a triangle, the lines being met at their common point by a third, equidistant from each. The lower part of the tree was torn into many thousand slivers, the writer having counted those of one-fifth part, amounting to 2,000. The top was broken into fragments innumerable, the ground being strewn with twigs varying from one to six inches in length. Upon reasonable calculation, the tree was shattered into at least as many as 20,000 fragments. The trunk was split into seven main sections, clear to the ground. At the roots the current divided into four parts, going north, south, east and west, plowing up the ground each way; in doing this, it seemed to follow the roots of the tree. The northern current went the farthest, tearing up the turf for twenty feet. The current to the west seemed to be the heaviest; at a few feet from the tree it struck a granite stone, one foot in diameter, split off the top of about two inches in thickness, tearing it into pieces varying from two inches square down to a splinter; it then struck another stone (decayed sandstone), to all appearance about ten inches through, and broke that in pieces, one being thrown about twenty feet from the tree; it next hurled a stone of fifteen pounds weight from its bed. Splinters were thrown ten rods or more from the tree. The specimens of this action may be found in the State Museum, at Albany.

W. S. H.

October, 1870.

LIST OF MOUNTED FISHES IN THE STATE MUSEUM.

SUB-CLASS I. TELEOSTEI MÜLL.

Order — TELEOCEPHALI Gill.

Percidæ Cuv.

PERCA AMERICANA Schk. The Yellow Perch. (No. 22 in collection.) *Morone flavescens* Mitch.; *Perca serrato-granulata* Cuv. et Val.; *P. granulata* Cuv. et Val.; *P. acuta* Cuv. et Val. Zoöl. New York, Part IV, pp. 3–6, pl. 1, fig. 1; pl. 22, fig. 64; pl. 68, figs. 220, 222. New York waters.

ROCCUS LINEATUS (Bloch.) Gill. The Striped Sea Bass.....(No. 2.) *Labrax lineatus* Cuv. et Val. Zoöl. New York, Part IV, p. 7, pl. 1, fig. 3. New York Bay.

POMOTIS AUREUS (Walb.) Gill. The Sun-fish..............(No. 23.) *Pomotis vulgaris* Rich. Zoöl. New York, Part IV, p. 31, pl. 51, fig. 166. New York waters.

Sciænidæ Cuv.

CYNOSCION REGALIS (Schn.) Gill. The Weak-fish...........(No. 1.) *Otalithus regalis* Cuv. et Val. Zoöl. New York, Part IV, p. 71, pl. 8, fig. 24. New York Bay.

SCIÆNOPS OCELLATUS (Linn.) Gill. The Branded Drum.... (No. 20.) *Corvina ocellata* Cuv. et Val. Zoöl. New York, Part IV, p. 75, pl. 21, fig. 61. New York Bay.

Ephippiidæ Gill.

PAREPHIPPUS FABER (Cuv. et Val.) Gill. Banded Ephippus..(No. 26.) *Ephippus faber* Cuv. et Val. Zoöl. New York, Part IV, p. 97, pl. 23, fig. 68. New York Bay.

Stromateidæ Gthr.

PEPRILUS LONGIPINNIS (Mitch.) Gill. Long-finned Harvest-fish. (No. 27.) *Rhombus longipinnis* Cuv. et Val. Zoöl. New York, Part IV, p. 136, pl. 75, fig. 239. New York Bay.

Elacatidæ Gill.

ELACATES CANADUS (Linn.) The Northern Crab-eater.....(No. 19.) *Elacate Atlantica* Cuv. et Val. Zoöl. New York, Part IV, p. 113, pl. 25, fig. 77. New York Bay.

Carangidæ Gill.

VOMER SETIPINNIS Ayres. The Blunt-nosed Shiner.......(No. 28.)
Vomer Brownii Cuv. et Val. Zoöl. New York, Part IV, p. 127, pl. 25, fig. 78. New York Bay.

TRACHYNOTUS CAROLINUS (Linn.) Gill ....(No. 30.)
Lichia Carolina (Linn.) Zoöl. New York, Part IV, p. 114, pl. 10, fig. 30. Carolina.

Echenididæ Bon.

LEPTECHENEIS NAUCRATES (Linn.) Gill. The Sea Sucker. Two spec. (No. 10).
Echeneis naucrates Linn. Zoöl. New York, Part IV, p. 308. New York Bay (Mitch.)

Xiphiidæ Bon.

XIPHIAS GLADIUS Linn. The Sword-fish.................(No. 33.)
Zoöl. New York, Part IV, p. 111, pl. 26, f. 79. New York Bay.

Cottidæ Rich.

COTTUS OCTODECIM-SPINOSUS Mitch. The Common Sculpin or Bull-head ....(Nos. 14, 15.)
Cottus Virginianus Storer. Zoöl. New York, Part IV, p. 51, pl. 5, fig. 13. New York Bay.

Scorpænidæ Sw.

HEMITRIPTERUS ACADIANUS (Penn.) Storer. The American Sea Raven. (Nos. 16, 17).
Hemitripterus Americanus Cuv. et Val. Zoöl. New York, Part IV, p. 56, pl. 6, fig. 16. New York Bay.

Uranoscopidæ Rich.

ASTROCOPUS ANOPLOS (Cuv. et Val.) Brevoort........ ..(No. 21.)
Uranoscopus anoplos Cuv. et Val. Zoöl. New York, Part IV, p. 37, pl. 22, fig. 65. Coast of Carolina.

Batrachidæ Rich.

BATRACHUS TAU (Linn.) Cuv. et Val. The Common Toad-fish (No. 44.)
Gadus tau Linn. *Batrachus celatus* DeKay (young of *tau*). Zoöl. New York, Part IV, p. 168, pl. 28, fig. 86. New York Bay.

Blenniidæ Bon.

ANARRHICAS VOMERINUS Agass. The Sea Wolf............(No. 5.)
Anarrhicas lupus Linn. Zoöl. New York, Part IV, p. 158, pl. 16, fig. 43.

Labridæ Cuv.

TAUTOGOLABRUS ADSPERSUS (Walb.) Gill. Common Burgall. (No. 24.)
Ctenolabrus ceruleus (Mitch.); *C. uninotatus* DeKay. Zoöl. New York, Part IV, pp. 172–174, pl. 29, figs. 93, 90. New York Bay.

Soleidæ Bon.

ACHIRUS LINEATUS (Linn.) Cuv. The New York Sole......(No. 39.)
Achirus mollis Cuv. Zoöl. New York, Part IV, p. 303, pl. 49, fig. 159. New York Bay.

Pleuronectidæ Bon.

PSEUDOPLEURONECTES AMERICANA (Walb.) Blkr. The Flat-fish...(No. 29.)
Platessa plana Storer. Zoöl. New York, Part IV, p. 295, pl. 48, fig. 154. New York Bay.

Salmonidæ Cuv.

SALMO FONTINALIS Mitch. The Brook Trout ....(No. 40.)
Zoöl. New York, p. 235, pl. 38, fig. 120. Hamilton Co., N. Y.
SALMO CONFINIS DeKay. The Lake Trout ....(No. 41.)
Zoöl. New York, Part IV, p. 238, pl. 38, fig. 123. Lake Ontario.
SALMO SALAR Linn. The Sea Salmon ....(No. 42.)
Zoöl. New York, Part IV, p. 241, pl. 38, fig. 122. Lake Ontario.

Order — APODES Kaup.

Anguillidæ Yarrell.

ANGUILLA BOSTONIENSIS (Lesueur). The New York Eel...(No. 35.)
Anguilla tenuirostris DeKay. Zoöl. New York, Part IV, p. 310, pl. 53, fig. 173. Chenango Canal.

Order — PLECTOGNATHI Cuv.

Balistidæ Cuv.

CERATACANTHUS AURANTIACUS (Mitch.) Gill. Orange File-fish. (No. 11.)
Monocanthus aurantiacus (Mitch.) Zoöl. New York, Part IV, p. 333, pl. 57, fig. 186. New York Bay.

Diodontidæ Rich.

DIODON PILOSUS Mitch. The Hairy Balloon-fish........... (No. 8.)
Zoöl. New York, p. 326, pl. 55, fig. 180. New York Bay.
CHILOMYCTERUS GEOMETRICUS Gill. Geometric Balloon-fish..(No. 6.)
Diodon maculato-striatus Mitch. Zoöl. New York, Part IV, p. 323, pl. 56, fig. 185. New York Bay.

Tetradontidæ Bon.

GASTROPHYSUS TURGIDUS (Mitch.) Gill. The Common Puffer (No. 7.)
Tetraodon turgidus (Mitch.) Zoöl. New York, Part IV, p. 327, pl. 55, fig. 178. New York Bay.

SUB-CLASS II. GANOIDEI MÜLL.

Order — RHOMBOGANOIDEI Gill.

Lepidosteidæ Bon.

LEPIDOSTEUS BISON DeKay. The Buffalo Bony Pike……(No. 43.)
Zoöl. New York, Part IV, p. 271, pl. 43, fig. 139. Lake Ontario.

Order — CHONDROSTEI Müll.

Sturionidæ Rich.

ACIPENSER BREVIROSTRIS Lesueur. Short-nosed Sturgeon..(No. 31.)
Zoöl. New York, Part IV, p. 345. Hudson River.

ACIPENSER OXYRHYNCHUS Mitch. Sharp-nosed Sturgeon ..(No. 34.)
Zoöl. New York, Part IV, p. 346, pl. 58, fig. 189. Lake Ontario.

SUB-CLASS III. ELASMOBRANCHII BON.

Order — PLAGIOSTOMI Cuv.

Galeorhinidæ Gill.

PLATYPODON OBSCURUS Gill. The Dusky Shark……….(No. 17.)
Carcharias obscurus (Lesueur). Zoöl. New York, Part IV, p. 350, pl. 61, fig. 201. New York Bay.

MUSTELUS CANIS DeKay. The Dog-Fish ………………(No. 37.)
Squalis canis Mitch. Zoöl. New York, Part IV, p. 355, pl. 64, fig. 209. New York Bay.

Cestraciontidæ Gill.

RENICEPS TIBURO Gill. The Hammer-head Shark………(No. 18.)
Zygoena tiburo Val.

Pristidæ Ag.

PRISTIS ANTIQUORUM Latham. The Saw-fish…………..(No. 32.)
Zoöl. New York, Part IV, p. 365. New York Bay. (Schœpff).

Raiidæ Bon.

RAIA AMERICANA DeKay. The Prickly Ray …………(No. 46.)
Zoöl. New York, Part IV, p. 368, pl. 66, fig. 215. New York Bay.

RAIA OCELLATA Mitch. The Spotted Ray……………..(No. 45.)
Zoöl. New York, Part IV, p. 369, pl. 65, fig. 212. New York Bay.

Trygonidæ Bon.

TRYGON CENTRURA (Mitch.) Gill. The Sting Ray........(No. 12.)
Zoöl. New York, Part IV, p. 374 (foot-note). Europe.

Myliobatidæ Müll.

RHINOPTERA QUADRILOBA (Lesueur). The Cow-nose Ray...(No. 13.)
Zoöl. New York, Part IV, p. 375, pl. 66, fig. 217. New York Bay.

SUB-CLASS IV. DERMOPTERI OWEN.

Order — HYPEROARTII Bon.

Petromyzontidæ Bon.

PETROMYZON AMERICANUS Lesu. American Sea Lamprey.. (No. 36.)
Zoöl. New York, Part IV, p. 379, pl. 66, fig. 216. Hudson River, near Albany.

LIST OF FISHES RECEIVED FROM THE SMITHSONIAN INSTITUTION IN 1865.*

5498..	Stizostedion Americanus *Gill*	Ohio.
1529..	Centropristis furvus *Gill*	Wood's Hole, Mass.
5447..	Haploidonotus grunniens *Gill*	St. Louis, Mo.
5489..	Lagodon rhomboides *Holb*	Florida.
5494..	† Lutjanus caxis *Gill*	Florida.
5534..	Orthopristis fulvomaculatus *Gill*	South Carolina.
5547..	Sarda pelamys *Cuv*	Massachusetts.
5530..	Selene argentea *Lac*	Carribean Sea.
5460..	Argyriosus vomer *Lac*	Virginia.
778..	Trachynotus Carolinus *Gill*	New Jersey.
5500..	Trachynotus Carolinus *Gill*	New Jersey.
1594..	Uranidea viscosa *Gill*	Reading, Pa.
5490..	† Sebastes viviparus *Kroyer*	Maine.
5031..	Chirostoma notatum *Gill*	Wood's Hole, Mass.
5418..	Lepomis auritus *Gill*	Carlisle, Pa.
5513..	Lepomis appendix *Gill*	Lake Erie.
5430..	† Lepomis nitidus *Gill*	Ohio.
5454..	Ambloplites rupestris *Gill*	Ohio.
5546..	Hyperistins hexacanthus *Gill*	Ohio.
5041..	Tautogolabrus adspersus *Gill*	Wood's Hole, Mass.
5497..	† Naudopsis tetracanthus *Gill*	Cuba.
5502..	Esox reticulatus *Les*	Beesley's Pt., N. J.
5499..	Esox Americanus *Gm*	Beesley's Pt., N. J.
5552..	Esox estor *Les*	Lake Erie.
877..	† Astyanax argentatus *B and G*	Texas.
5518..	Osmerus mordax *Gill*	Cape Cod, Mass.
5537..	Pomolobus mediocris *Gill*	New Jersey.
1588..	Brevoortia menhaden *Gill*	New Jersey.
5486..	Dorosoma cepedianum *Gill*	New Jersey.

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* Acknowledgment of the donation was made in the Nineteenth Annual Report on the State Cabinet.

† With the exception of the species thus marked, all in the list have been found in the waters of the State of New York.

5437	Exoglossum maxillingua *Hald.*	Maryland.
5549	Merlucius bilinearis *Gill*	Maine.
5491	† Rhombus maximus *Cuv*	Mediterranean.
5462	Lophopsetta maculata *Gill*	South Carolina.
5463	Achirus lineatus *Cuv*	C. Carolina.
5485	Anguilla Bostoniensis *St*	Piermont, N. Y.
5417	† Ostracion triqueter *L*	Bahamas.
1589	Syngnathus Peckianus *St*	New Jersey.
5553	Amia calva *L*	Detroit, Mich.
5187	† Scaphirhynchops platyrhynchus *Gill*	St. Louis, Mo.
5542	† Polyodon folium *Lac*	St. Louis, Mo.
1582	Hydrargyra majalis *Val.*, ♂, ♀	Beesley's Pt., N. J.
5524	Fundulus pisculentus *Val.*, ♀	Beesley's Pt., N. J.
5525	Fundulus pisculentus *Val.*, ♂	Beesley's Pt., N. J.

† With the exception of the species thus marked, all in the list have been found in the waters of the State of New York.

REPORT OF THE BOTANIST.

S. B. Woolworth, LL.D.,
Secretary of the Board of Regents of the
University of the State of New York:

Sir.—The following report of work done during the year 1869, toward perfecting the State Herbarium, is respectfully submitted:

Since the date of my last report, specimens of four hundred and twenty-two species of plants have been poisoned, mounted and placed in the Herbarium, three hundred and fifty-four of which were not before represented in it. Sixty-eight are varieties previously unrepresented, or better specimens than had before been obtained. A list of the names is given in a paper marked (1).

Specimens have been collected in the counties of Albany, Rensselaer, Saratoga, Warren, Hamilton, Lewis, Oneida, Otsego, Schoharie, Greene, Putnam and Orange, representing three hundred and one species new to the Herbarium, two hundred and ninety-nine new to the State and eighty-seven new to science, two of them representing two new genera. A list of these is given in a paper marked (2).

Specimens have been contributed, or obtained by exchange or in naming, which were collected in the counties of Suffolk, Richmond, New York, Westchester, Rockland, Ulster, Greene, Oneida, Onondaga and Erie. Of these, seventy-eight are new to the Herbarium and not among my collections of the past season, seventy-six are additions to the flora of the State and three are new species. If these be added to the collected species, the total becomes three hundred and seventy-nine new to the Herbarium, three hundred and seventy-five new to the State, and ninety new species.

A classified tabular statement is given below:

		New to the Herbarium.	New to the State.	New Species.	New Genera.
Plants collected......	Ferns..........	2	....	..	...
	Lichens	11	11	..	...
	Fungi	288	288	87	2
Total	....	301	299	87	2
Plants contributed ...	Flowering plants	15	13	..	...
	Mosses	2	2	..	...
	Lichens	15	15	..	...
	Fungi	46	46	3	...
Total	....	78	76	3	...
Collected and contrib'ted	....	379	375	90	2

This statement does not include a large number of contributed specimens of species already represented in the Herbarium, nor unrepresented varieties of such species, neither extra limital ones. Of the latter class there are about thirty species, the specimens being from Rhode Island, New Jersey, Pennsylvania, Illinois, Colorado, California, Mexico, Michigan, Alabama and China. It is a gratifying fact, and one that indicates an increasing interest in botanical studies and investigations, that in no previous year have botanical contributions, communications and inquiries been received in so great numbers, nor from so many persons. Thanks are due to the botanists of this State and of others for their liberal contributions. A list of them is given in a paper marked (3).

New species and their descriptions, previously unreported species, remarkable varieties and observations, are given in a paper marked (4).

Appended to the list of collected plants, marked (2), is a list of edible fungi, collected and contributed; fourteen species in all, making, with those previously reported, about sixty edible species in the State.

Agaricus abortivus has not before been published as edible, but it is now thus classed, after a trial of its edible qualities without any disagreeable results. Writers differ in their estimate of the qualities of *Agaricus melleus* and *Lactarius piperatus.* The former is said by some to be disagreeable and nauseous and the latter has even been classed with the poisonous species. Aware that tastes differ in such matters, I simply express my own views, after a fair trial of these species, in saying that the former, when well cooked, is decidedly good, and the latter is not only harmless, but scarcely inferior in edible qualities to the much lauded *Lactarius deliciosus.* The unpleasant or acrid taste of these species when raw is perhaps the occasion of hostility to them. *Agaricus ostreatus, Cantharellus cibarius* and *Lycoperdon giganteum* afford a very palatable dish, but *Helvella esculenta* and *Hydnum coralloides* have to me a somewhat strong fungoid flavor, but they produce no bad effects, and perhaps by different preparation might furnish agreeable food.

The species of the genera Clavaria and Æcidium are not in all cases sharply defined, and they therefore present some difficulties to the student. With a view to aid students in their discrimination of the species already found in the State, a synopsis of them is given in a paper marked (5).

The plan of making colored drawings of the fleshy fungi has been followed and in some instances extended so as to include microscopic species. The number of species and varieties thus figured the past season is one hundred and sixty-three. The figures will be placed on the species sheet with the dried specimens, and though not especially artistic, being often of necessity hastily made before the plant should wither, they serve to show the essential characters of the plant, and will be of great aid to those studying the specimens.

The condition of the specimens in the Herbarium is unimpaired. The specimens of fleshy fungi, though especially liable to the attacks of insects, have in no instance, so far as I can see, been at all affected, a good indication of their having been well poisoned. The preparation used consists of the following components:

Corrosive sublimate................ 4 drachms,
Sulphuric ether..................... 3 ounces,
Mix and add:
Spirits of turpentine................ 2 ounces,
Alcohol .... 3 ounces.

The method employed in drying specimens of fleshy fungi differs somewhat from that laid down in books. They are dried as soon as possible by exposing them to the full rays of the sun whenever that is practicable. In cloudy weather they must be dried by a fire, care being taken not to heat them so much as to burn them. After they are thoroughly dried they are exposed to the moist atmosphere of a clear summer's night, or a damp day, until they are sufficiently soft and flexible to be pressed into proper shape by the thumb and fingers, after which they are placed in a paper press and dried like other plants.

(1)

SPECIES OF WHICH SPECIMENS HAVE BEEN MOUNTED.

Hepatica acutiloba *DC.*
Ranunculus bulbosus *L.*
Aquilegia vulgaris *L.*
Liriodendron Tulipifera *L.*
Dicentra cucullaria *DC.*
Viola cucullata v. palmata *Gray.*
Lechea minor *Lam.*
Ascyrum Crux-Andreæ *L.*
Impatiens pallida *Nutt.*
Vitis cordifolia *Michx.*
Lespedeza violacea *Pers.*
Lathyrus maritimus *Bigel.*
Prunus Americana *Marshall.*
P. maritima *Wang.*
P. Virginiana *L.*
Potentilla arguta *Pursh.*
Cratægus coccinea *L.*
Œnothera fruticosa *L.*
Thaspium aureum *Nutt.*
Aralia nudicaulis *L.*
Eupatorium purpureum *L.*
Helianthus strumosus *L.*
Achillea Millefolium *L.*
Nabalus nanus *DC.*
Lobelia Nuttallii *R. & S.*
L. syphilitica *L.*
Vaccinium vacillans *Sol.*
Andromeda polifolia *L.*
Veronica peregrina *L.*
Echium vulgare *L.*
Nicotiana rustica *L.*
Asclepias incarnata *L.*
Chenopodium murale *L.*
C. urbicum *L.*
C. album *L.*
Atriplex patula *L.*
Polygonum maritimum *L.*
Rumex Britannica *L.*
R. verticillatus *L.*
Callitriche verna *L.*
Parietaria Pennsylvanica *Muhl.*
Quercus obtusiloba *Michx.*
Betula glandulosa *Michx.*
Salix humilis *Marshall.*
S. sericea *Marshall.*
Taxus Canadensis *Willd.*
Scheuchzeria palustris *L.*
Habenaria bracteata *R. Br.*
Spiranthes cernua *Richard.*
Cypripedium parviflorum *Salisb*
Trillium cernuum *L.*
Scirpus pungens *Vahl.*
Carex fœnea *Willd.*
C. alata *Torr.*
C. Buxbaumii *Wahl.*
C. grisea *Wahl.*
C. pubescens *Muhl.*
Bromus racemosus *L.*
B. Kalmii *Gray.*
B. sterilis *L.*
Panicum capillare *L.*
P. virgatum *L.*
Woodsia glabella *R. Br.*
Pellæa gracilis *Hook.*
Aspidium cristatum *Swartz.*
A. acrostichoides *Swartz.*
Osmunda Claytoniana *L.*
Botrychium lunarioides *Swartz.*

NEW TO THE HERBARIUM.

Nymphæa minor *DC.*
Reseda alba *L.*

Raphanus sativus *L.*
Silene Armeria *L.*
Lychnis vespertina *Sibth.*
Spergularia media *Presl.*
Althæa rosea *Cav.*
A. ficifolia *Cav.*
Malva Alcea *L.*
Polygala lutea *L.*
Trifolium procumbens *L.*
Saxifraga aizoides *L.*
Sedum ternatum *Michx.*
Anethum Foeniculum *L.*
Coriandrum sativum *L.*
Galium Mollugo *L.*
Valeriana officinalis *L.*
Aster azureus *Lindl.*
Solidago Houghtonii *T. & G.*
Nabalus Boottii *DC.*
Tragopogon porrifolius *L.*
Lactuca sativa *L.*
Matricaria Chamomilla *L.*
M. Parthenium *L.*
Cirsium altissimum *Spreng.*
Silybium Marianum *Gaert.*
Lampsana communis *L.*
Alyssum calycinum *L.*
Dianthus Armeria *L.*
Campanula rapunculoides *L.*
Rhinanthus Crista-galli L.
Hyssopus officinalis *L.*
Phlox paniculata *L.*
Polemonium cœruleum *L.*
Vinca minor *L.*
Vincetoxicum nigrum *L.*
Corispermum Hyssopifolium *L.*
Amarantus spinosus.
A. hypochondriacus *L.*
Polygonum incarnatum *Ell.*
P. lapathifolium *Ait.*
Euphorbia Peplus *L.*
E. Lathyris *L.*
Juniperus Sabina v. procumbens *Pursh.*
Sparganium eurycarpum *Eng.*
Tofieldia glutinosa *Willd.*
Carex sterilis *Willd.*
Calamagrostis Pickeringii *Gray.*
Stipa Richardsonii *Link.*
Triticum vulgare *Vill.*
Aspidium fragrans *Swartz.*
Bruchia flexuosa *Schwægr.*
Bryum Lescurianum *Sulliv.*
Dicranum pellucidum *Hedw.*
Plagiothecium latebricola *B. E.*
Biatora Hypnophila *Ach.*
Buellia geographica *L.*
Coniocybe pallida *Fr.*
Placodium cerinum *Hedw.*
Opegrapha varia *Ach.*
Calicium subtile *Pers.*
C. Curtisii *Tuck.*
Arthonia astroidea *Ach.*
Lecanora ventosa *Ach.*
Cetraria nivalis *Ach.*
Mycoporum pycnorum *Tuck.*
Lyngbya flacca *Ag.*
Desmarestia aculeata *Lamour.*
Callithamnion cruciatum *Ag.*
C. virgultorum *Harv.*
Enteromorpha intestinalis *Lk.*
Nemalion multifidum *J. Ag.*
Rhodomela subfusca *Ag.*
Calothrix confervicola *Ag.*
Cladophora uncialis *Fl. Dan.*
Agaricus vernus *Fr.*
A. Phalloides *Fr.*
A. cæsareus *Scop.*
A. vaginatus *Bull.*
A. Ceciliæ *B. & Br.*
A. farinosus *Schw.*
A. clypeolarius *Bull.*
A. acutesquamosus *Weinm.*
A. naucinus *Fr.*
A. granulosus *Batsch.*
A. vaccinus *Pers.*
A. variegatus *Scop.*
A. personatus *Fr.*
A. alboflavidus *Pk.*
A. nebularis *Batsch.*
A. infundibuliformis *Scha.*
A. carnosior *Pk.*
A. illudens *Schw.*
A. Adirondackensis *Pk.*
A. Poculum *Pk.*
A. brumalis *Fr.*
A. ditopus *Fr.*
A. metachrous *Fr.*
A. vulgaris *Pers.*
A. paluster *Pk.*
A. collariatus *Fr.*

Agaricus prælongus *Pk.*
A. galericulatus *Scop.*
A. purus *Pers.*
A. Corticola *Schum.*
A. sanguinolentus *A. & S.*
A. Familia *Pk.*
A. dryophilus *Bull.*
A. stipitarius *Fr.*
A. Campanella *Batsch.*
A. Fibula *Bull.*
A. umbelliferus *L.*
A. cervinus *Schaeff.*
A. nanus *Pers.*
A. leoninus *Schæff.*
A. rhodopolius *Fr.*
A. strictior *Pk.*
A. serrulatus *Pers.*
A. adiposus *Fr.*
A. temnophyllus *Pk.*
A. Hallianus *Pk.*
A. curvo-marginatus *Pk.*
A. scorpioides *Fr.*
A. semiorbicularis *Bull.*
A. Lignicola *Pk.*
A. autumnalis *Pk.*
A. vernalis *Pk.*
A. lateritius *Fr.*
A. ovalis *Fr.*
A. tener *Schaeff.*
A. Hypnorum *Batsch.*
A. rimosus *Bull.*
A. fastigiatus *Fr.*
A. subochraceus *Pk.*
A. flocculosus *Berk.*
A. geophyllus *Sow.*
A. sarcophyllus *Pk.*
A. silvicola *Vitt.*
A. Hornemanni *Fr.*
A. Johnsonianus *Pk.*
A. perplexus *Pk.*
A. semiglobatus *Batsch.*
A. stercorarius *Fr.*
A. spadiceus *Fr.*
A. cernuus *Mull.*
A. semilanceolatus *Fr.*
A. solidipes *Pk.*
A. retirugis *Batsch.*
A. campanulatus *L.*
A. papilionaceus *Bull.*
A. fimicola *Fr.*
Agaricus gracilis *Fr.*
A. atomatus *Fr.*
A. disseminatus *Pers.*
Coprinus tomentosus *Fr.*
C. niveus *Fr.*
C. micaceus *Fr.*
C. plicatilis *Fr.*
C. ephemerus *Fr.*
Cortinarius caperatus *Fr.*
C. coloratus *Pk.*
C. communis *Pk.*
C. luteofuscus *Pk.*
C. collinitus *Fr.*
C. tricolor *Pk.*
C. argentatus *Fr.*
C. alboviolaceus *Fr.*
C. violaceus *Fr.*
C. subochraceus *Pk.*
C. autumnalis *Pk.*
C. Catskillensis *Pk.*
C. squamulosus *Pk.*
C. armillatus *Fr.*
C. castaneoides *Pk.*
C. biformis *Fr.*
C. distans *Pk.*
C. sanguineus *Fr.*
C. cinnamomeus *Fr.*
C. castaneus *Fr.*
C. vernalis *Pk.*
Hygrophorus chrysodon *Fr.*
H. congelatus *Pk.*
H. coccineus *Fr.*
H. nitidus *B. & C.*
Lactarius pyrogalus *Fr.*
L. plumbeus *Fr.*
L. glyciosmus *Fr.*
L. platyphyllus *Pk.*
L. affinis *Pk.*
L. sordidus *Pk.*
L. torminosus *Fr.*
L. subdulcis *Fr.*
L. camphoratus *Fr.*
L. rufus *Fr.*
L. uvidus *Fr.*
L. piperatus *Fr.*
Russula decolorans *Fr.*
R. nitida *Fr.*
R. fœtens *Fr.*
Cantharellus floccosus *Schw.*
C. cibarius *Fr.*

Cantharellus cinnabarinus *Schw.*
C. infundibuliformis *Fr.*
C. aurantiacus *Fr.*
C. dichotomus *Pk.*
Marasmius subvenosus *Pk.*
M. scorodonius *Fr.*
M. oreades *Fr.*
Lentinus cochleatus *Fr.*
L. lepideus *Fr.*
Lenzites Cratægi *Berk.*
Boletus luteus *L.*
B. collinitus *Fr.*
B. albus *Pk.*
B. Elbensis *Pk.*
B. flavidus *Fr.*
B. pictus *Pk.*
B. Clintonianus *Pk.*
B. spectabilis *Pk.*
B. paluster *Pk.*
B. Sistotrema *Fr.*
B. subtomentosus *Fr.*
B. edulis *Bull.*
B. cyanescens *Bull.*
B. scaber *Bull.*
B. retipes *B. & C.*
B. auriporus *Pk.*
B. strobilaceus *Scop.*
Polyporus salicinus *Fr.*
Thelephora laciniatus *Pers.*
Bovista nigrescens *Pers.*
B. plumbea *Pers.*
Lycoperdon giganteum *Batsch.*
L. cælatum *Fr.*
Geaster saccatus *Fr.*
Didymium cinereum *Fr.*
Æcidium Impatientis *Schw.*
Æ. Geranii *DC.*
Æ. Limonii *Pk.*
Æ. Myricatum *Schw.*
Æ. Orobi *DC.*
Æ. Fraxini *Schw.*
Æ. Violæ *Schum.*
Æ. Œnotheræ *Pk.*
Æ. pustulatum *Curt.*
Æ. Podophylli *Schw.*
Æ. Epilobii *DC.*
Æ. quadrifidum *DC.*
Æ. Ranunculi *Schw.*
Æ. Claytoniatum *Schw.*
Æ. macrosporum *Pk.*
Æcidium Compositarum *Mart.*
Æ. Clematitis *Schw.*
Ravenelia glanduliformis *B.&C.*
Polycystis Ranunculacearum *Desm.*
Uromyces macrospora *B. & C.*
U. Limonii *Lev.*
Ustilago segetum *Ditm.*
Podisoma macropus *Schw.*
Aregma mucronatum *Fr.*
Triphragmium clavellosum *Berk.*
Puccinia Tiarellæ *B. & C.*
P. Compositarum *Sch.*
P. Helianthi *Schw.*
P. Asteris *Schw.*
P. Xanthii *Schw.*
P. Violarum *Lk.*
P. Umbelliferarum *DC.*
P. Circææ *Pers.*
P. porphyrogenita *Curt.*
P. mesomajalis *B. & C.*
P. Anemones *Pers.*
P. coronata *Cd.*
P. Peckianum *Howe.*
Uredo Ari-Virginici *Schw.*
U. Cichoracearum *Lev.*
U. Chærophylli *Schw.*
U. Filicum *Desm.*
U. Azaleæ *Schw.*
U. Rubigo *DC.*
U. Vacciniorum *Johnst.*
U. pustulata *Pers.*
Lecythea cylindrica *Strauss.*
L. gyrosa *Berk.*
L. Saliceti *Lev.*
Cystopus candidus *Lev.*
Microthyrium Smilacis *De Not.*
Cryptosporium filicinum *B. & C.*
Coniothecium toruloideum *B. & C.*
Sphæropsis Candollei *B. & Br.*
Stilbospora magna *Berk.*
Diplodia Mori *Berk.*
Streptothrix atra *B. & C.*
Helminthosporium Tiara *B. & R.*
H. macrocarpon *Grev.*
Sporocybe Persicæ *Fr.*

Fusisporium Buxi *Fr.*
F. miniatum *B. & C.*
Macrosporium Cheiranthi *Fr.*
Septoria Polygonorum *Desm.*
S. Œnotheræ *B. & C.*
S. Rubi *B. & C.*
S. Toxicodendri *Curt.*
S. sanguinea *Desm.*
S. destruens *Desm.*
S. viride-tingens *Curt.*
S. Liriodendri *B. & C.*
S. Vitis *B. & C.*
S. Plantaginicola *B. & C.*
S. Pyri *Curt.*
Ascospora Podophylli *Curt.*
Labrella Pomi *Mont.*
Helvella Infula *Schæff.*
Leotia lubrica *Pers.*
L. circinans *Pers.*
Bulgaria rufa *Schw.*
Rhizina undulata *Fr.*
Peziza cyathoidea *Bull.*
P. anomala *Pers.*
P. coccinea *Jacq.*
P. Virginea *Batsch.*
P. floccosa *Schw.*
Tympanis picastra *B. & C.*
Hysterium flexuosum *Schw.*
H. Rubi *Pers.*
Hysterium Fraxini *Pers.*
Glonium stellatum *Muhl.*
Cordyceps militaris *Fr.*
C. purpurea *Fr.*
Hypoxylon multiforme *Fr.*
H. nummularium *Fr.*
H. coprophilum *Fr.*
Diatrype virescens *Schw.*
D. Duriæi *Mont.*
D. haustellata *Fr.*
D. stigma *Fr.*
Melogramma Quercuum *Fr.*
Massaria vomitoria *B. & C.*
Sphæria aquila *Fr.*
S. putaminum *Schw.*
S. morbosa *Schw.*
S. doliolum *Pers.*
Microsphæria Syringæ *Schw.*
M. Vaccinii *Pk.*
Erysiphe lamprocarpa *Lev.*
E. fuscata *B. & C.*
Uncinula adunca *Lev.*
Dothidea Robertiani *Fr.*
Depazea Smilacicola *Schw.*
D. Pyrolæ *Fr.*
D. Kalmicola *Schw.*
D. Fraxinicola *Curt.*
Asterina Gaultheriæ *Curt.*

(2)

PLANTS COLLECTED NEW TO THE HERBARIUM.

Aspidium aculeatum *Swartz.*
A. Thelypteris *Swartz.*
Cetraria nivalis *Ach.*
C. Pinastri *Ach.*
Lecanora ventosa *Ach.*
Biatora exigua *Fr.*
B. lucida *Fr.*
Arthonia astroidea *Ach.*
Pyrenula leucoplaca *DC.*
Umbilicaria Pennsylvanica *Hm.*
Coniocybe furfuracea *Fr.*
Leptogium pulchellum *Nyl.*
Ephebe pubescens *Fr.*
Agaricus rubescens *Pers.*
A. volvata *Pk.*
A. equestris *L.*
A. Schumacheri *Fr.*
A. Trentonensis *Pk.*
A. chrysenteroides *Pk.*
A. Sienna *Pk.*
A. Hoffmani *Pk.*
A. ectypoides *Pk.*
A. Calathus *Buxb.*
A. marmoreus *Pk.*
A. fragrans *Sow.*
A. zonatus *Pk.*
A. clusilis *Fr.*
A. spinulifer *Pk.*
A. simillimus *Pk.*
A. Leaianus *Berk.*
A. hæmatopus *Pers.*
A. Tintinabulum *Paul.*
A. leptophyllus *Pk.*
A. Fibuloides *Pk.*
A. lilacinus *Pk.*
A. pyxidatus *Fr.*
A. ulmarius *Fr.*
A. porrigens *Pers.*
A. admirabilis *Pk.*
A. sericellus *Fr.*
A. Grayanus *Pk.*
A. Woodianus *Pk.*
A. abortivus *B. & C.*
A. Seymourianus *Pk.*
A. asprellus *Fr.*
A. scabrosus *Fr.*
Agaricus conicus *Pk.*
A. Clintonianus *Pk.*
A. delicatulus *Pk.*
A. cuspidatus *Pk.*
A. salmoneus *Pk.*
A. flammans *Fr.*
A. squarrosus *Mull.*
A. heteroclitus *Fr.*
A. aggericola *Pk.*
A. Highlandensis *Pk.*
A. illicitus *Pk.*
A. excedens *Pk.*
A. Ascophorus *Pk.*
A. mutatus *Pk.*
A. dorsalis *Pk.*
A. mollis *Schæff.*
A. variabilis *Pers.*
A. haustellaris *Fr.*
A. Greigensis *Pk.*
A. eximius *Pk.*
A. limicola *Pk.*
A. odoratus *Pk.*
Coprinus radiatus *Bolt.*
C. silvaticus *Pk.*
C. semilanatus *Pk.*
Bolbitius nobilis *Pk.*
Cortinarius corrugatus *Pk.*
C. olivaceus *Pk.*
C. bolaris *Fr.*
C. asper *Pk.*
C. evernius *Fr.*
Gomphidius viscidus *Fr.*
Hygrophorus puniceus *Fr.*
H. miniatus *Fr.*
H. lætus *Fr.*
H. psittacinus *Schæff.*
Lactarius serifluus *DC.*
L. cinereus *Pk.*
L. fumosus *Pk.*
L. trivialis *Fr.*
L. insulsus *Fr.*
L. Chelidonium *Pk.*
Russula virescens *Fr.*
R. Mariæ *Pk.*
R. rubra *Fr.*
R. simillimus *Pk.*

Paxillus involutus *Batsch.*
Cantharellus cinereus *Fr.*
Plicatura Alni *Pk.*
Marasmius candidus *Fr.*
M. perforans *Fr.*
M. pulcherripes *Pk.*
M. papillatus *Pk.*
M. filopes *Pk.*
M. striatipes *Pk.*
M. anomalus *Pk.*
M. decurrens *Pk.*
Panus salicinus *Pk.*
Boletus bicolor *Pk.*
B. gracilis *Pk.*
Polyporus poripes *Fr.*
P. glomeratus *Pk.*
P. rubiginosus *Rostk.*
P. marginatus *Fr.*
P. fumosus *Fr.*
P. betulinus *Fr.*
P. cæsius *Fr.*
P. zonatus *Fr.*
P. velutinus *Fr.*
P. elongatus *Berk.*
P. Viticola *Fr.*
P. Vaillantii *Fr.*
P. vesiculosus *B. & C.*
P. corticola *Fr.*
Trametes sepium *Berk.*
Hydnum ferrugineum *Fr.*
H. zonatum *Batsch.*
H. pithyophilum *B. & C.*
Kneiffia setigera *Fr.*
K. candidissima *B. & C.*
Odontia fimbriata *Fr.*
Phlebia radiata *Fr.*
P. zonata *B. & C.*
Guepinia spathularia *Fr.*
Craterellus lutescens *Fr.*
Stereum albobadium *Schw.*
S. Curtissii *Berk.*
S. rugosum *Fr.*
Corticium incarnatum *Fr.*
C. Liquidambaris *B. & C.*
C. scutellatum *B. & C.*
C. salicinum *Fr.*
C. Auberianum *Mont.*
C. Rubicola *B. & C.*
Thelephora coralloides *Fr.*
Thelephora tuberosa *Grev.*
T. caryophyllæa *Fr.*
T. sebacea *Fr.*
Clavaria argillacea *Fr.*
C. fragilis *Holmsk.*
C. mucida *Pers.*
C. ligula *Fr.*
C. tetragona *Schw.*
C. flava *Fr.*
C. cinerea *Bull.*
C. trichopus *Pers.*
C. Kunzei *Fr.*
C. spinulosa *Pers.*
C. apiculata *Fr.*
C. crispula *Fr.*
Calocera cornea *Fr.*
C. palmata *Fr.*
C. viscosa *Fr.*
Tremella foliacea *Pers.*
Exidia repanda *Fr.*
Næmatelia nucleata *Fr.*
N. atrata *Pk.*
Cyphella fulva *B. & R.*
Phallus impudicus *Fr.*
Corynites Ravenelii *Berk.*
Geaster minimus *Schw.*
Lycoperdon molle *Pers.*
L. atropurpureum *Vitt.*
L. subincarnatum *Pk.*
Scleroderma Bovista *Fr.*
Stemonitis fusca *Roth.*
Trichia pyriformis *Hoffm.*
T. chrysosperma *DC.*
T. varia *Pers.*
T. serpula *Pers.*
Arcyria punicea *Pers.*
Didymium squamulosum *A. S.*
Dictydium magnum *Pk.*
Microthyrium Smilacis *De N.*
Leptostroma vulgare *Fr.*
Phoma ampelinum *B. & C.*
P. Menispermi *Pk.*
Sphæronema subulatum *Fr.*
S. pruinosum *Pk.*
S. Coryli *Pk.*
S. acerinum *Pk.*
Sphæropsis pulchella *B. & C.*
S. Menispermi *Pk.*
S. anomala *Pk.*

Vermicularia Dematium *Fr.*
V. ovata *Schw.*
Discosia Artocreas *Fr.*
Melanconium bicolor *Fr.*
Discella obscura *B. & C.*
Coryneum clavæsporium *Pk.*
Nemaspora aurea *Fr.*
N. Russellii *B. & C.*
Septoria Violæ *Desm.*
S. Erigeronis *Pk.*
S. Phlyctænoides *B. & C.*
S. Hippocastani *B. & Br.*
S. Nabali *B. & C.*
S. Lobeliæ *Pk.*
Cytispora melasperma *Fr.*
C. parva *B. & C.*
C. coryneoides *B. & C.*
C. Pinastri *Fr.*
C. hyalosperma *Fr.*
Torula populina *Pk.*
Uredo Aspidiotus *Pk.*
U. Æcidioides *Pk.*
Trichobasis Iridicola *Pk.*
T. suaveolens *Lev.*
Ustilago longissima *Tul.*
U. Montagnei *Tul.*
Uromyces Polygoni *Fuckel.*
U. Caricis *Pk.*
Pileolaria brevipes *B. & C.*
Aregma obtusatum *Fr.*
Puccinia Noli-tangeris *Cd.*
P. minutula *Pk.*
P. Pyrolæ *Cooke.*
P. Convolvuli *B. & C.*
P. tripustulata *Pk.*
P. Gerardii *Pk.*
P. emaculata *Schw.*
P. striola *Lk.*
Æcidium Berberidis *Pers.*
Æ. Erigeronatum *Schw.*
Æ. tenue *Schw.*
Æ. Osmorrhizæ *Pk.*
Æ. Mariæ-Wilsoni *Pk.*
Rœstelia cornuta *Tul.*
Stilbum Rhois *B. & C.*
S. pellucidum *Schrad.*
S. giganteum *Pk.*
Fusarium erubescens *B. & C.*
Tubercularia nigricans *DC.*
Oidium fructigenum *Kze.*
Sepedonium chrysospermum *Fr.*
Monotospora triseptata *Pk.*
Helvella crispa *Fr.*
H. sulcata *Afz.*
H. elastica *Bull.*
H. gracilis *Pk.*
Leotia circinans *Pers.*
Geoglossum luteum *Pk.*
G. glabrum *Pers.*
Peziza fusca *Pers.*
P. rubricosa *Fr.*
P. vinosa *A. & S.*
P. mollisioides *Schw.*
P. Erinaceus *Schw.*
P. echinosperma *Pk.*
P. æruginosa *Fr.*
P. hemisphærica *Wigg.*
P. cariosa *Pk.*
P. rubra *Pk.*
P. Tiliæ *Pk.*
P. comata *Schw.*
P. Persoonii *Moug.*
Dermatea furfuracea *Fr.*
Nodularia balsamicola *Pk.*
Sphinctrina Cerasi *B. & C.*
Tympanis alnea *Pers.*
Cenangium triangulare *Schw.*
C. Prunastri *Fr.*
C. Cerasi *Fr.*
Hysterium pulicare *Fr.*
H. Smilacis *Schw.*
H. Azaleæ *Schw.*
H. virgultorum *Desm.*
Xylaria corniformis *Fr.*
Rhizomorpha subcorticalis *Pers.*
Hypocrea floccosa *Fr.*
Hypoxylon concentricum *Bolt.*
H. Howeianum *Pk.*
H. perforatum *Schw.*
H. argillaceum *Fr.*
H. Beaumontii *B. & C.*
H. Morseii *B. & C.*
H. anthracodes *Fr.*
Nectria Peziza *Fr.*
Valsa pulchella *Fr.*
V. salicina *Fr.*
V. leucostoma *Fr.*
V. Pini *Fr.*
Sphæria aculeans *Schw.*

Sphæria Tiliæ *Fr.*
S. longissima *Pers.*
S. Coptis *Schw.*
S. Sarraceniæ *Schw.*
S. Solidaginis *Schw.*
S. Taxicola *Pk.*
Dothidea Ribesia *Pers.*
Dothidea Sambuci *Fr.*
D. crystallophora *B. & C.*
D. flabella *B. & C.*
D. Pteridis *Pers.*
D. Anemones *Fr.*
Erineum roseum *Schultz.*
Podosphæria Cerasi *Lev.*

EDIBLE FUNGI.

Agaricus rubescens *Pers.*
A. ulmarius *Sow.*
A. abortivus *B. & C.*
A. squarrosus *Mull.*
Paxillus involutus *Fr.*
Lactarius insulsus *Fr.*
Russula virescens *Fr.*
Polyporus poripes *Fr.*
Clavaria flava *Fr.*
C. tetragona *Schw.*
Helvella crispa *Fr.*
H. sulcata *Afz.*

Contributed.

Agaricus bombycinus *Schœff.*
Polyporus frondosus *Fr.*

(3)

LIST OF CONTRIBUTORS AND THEIR CONTRIBUTIONS.

W. H. Leggett, New York.

Clematis ochroleuca *Ait.*
Thalictrum purpureum *L.*
Ranunculus ab. v. micrantha *Gr.*
R. Cymbalaria *Pursh.*
Corydalis flavula *Raf.*
Nasturtium palustre *DC.*
N. sylvestre *R. Br.*
Barbarea præcox *R. Br.*
Arabis perfoliata *Lam.*
Erysimum cheiranthoides *L.*
Alliaris officinalis *Ander.*
Lepidium ruderale *L.*
Draba Caroliniana *Walt.*
Polanisia graveolens *Raf.*
Viola primulæfolia *L.*
Lechea Novæ-Cæsareæ *Aust.*
Silene inflata *Smith.*
S. Armeria *L.*
Lychnis vespertina *Sibth.*
Arenaria peploides *L.*
Cerastium oblongifolium *Torr.*
Stellaria longifolia *Muhl.*
Linum striatum *Walt.*
Parnassia Caroliniana *Michx.*
Frangula Caroliniana *Gray.*
Polygala polygama *Walt.*
P. brevifolia *Nutt.*
P. Nuttallii *T. & C.*
Coronilla varia *DC.*
Prunus maritima *Wang.*
Rubus cuneifolius *Pursh.*
Cratægus parvifolia *Ait.*
Sedum acre *L.*
Galium Mollugo *L.*
Stylosanthes elatior *Swartz.*
Galactia mollis *Michx.*
Ludwigia alternifolia *L.*
L. sphærocarpa *Ell.*
Ammannia humilis *Michx.*
Lythrum Hyssopifolia *L.*
L. lineare *L.*
Hydrocotyle interrupta *Muhl.*
Eclipta pro. v. brachypoda *Gr.*
Eupatorium rotundifolium *L.*
E. pubescens *Muhl.*
Galinsoga parviflora *Cav.*
Liatris scariosa *Willd.*
Solidago rigida *L.*

Melissa officinalis *L.*
Mentha rotundifolia *L.*
M. aqu. v. crispa *Benth.*
Ilex opaca *Ait.*
Cuscuta inflexa *Engelm.*
Lemna minor *L.*
Wolffia Columbiana *Karst.*
Potamogeton hybridus *Michx.*
Tipularia discolor *Nutt.*
Commelyna Virginica *L.*
Eleocharis olivacea *Torr.*
Botrychium lanceolatum *Angst.*

J. S. MERRIAM, New York.

Sesuvium Portulacastrum *L.*
Nabalus racemosus *Hook.*
Crepis virens *L.*

S. N. COWLES, Otisco, N. Y.

Carex capillaris *L.*

W. R. GERARD, Poughkeepsie, N. Y.

Æcidium Urticæ *DC.*
Æ. Iridis *Gerard.*
Æ. aroid. v. Caladii *Schw.*
Rœstelia cornuta *Tul.*
Aregma obtusatum *Fr.*
Pileolaria brevipes *B. & C.*
Glonium stellatum *Muhl.*
Hypoxylon concentricum *Bol.*

G. B. BRAINERD, Brooklyn, N. Y.

Juncus maritimus *Lam.*

E. L. HANKENSON, Newark, N. Y.

Hibiscus Trionum *L.*
Claytonia Virginica *L.*
Gaylussacia frondosa *T. & G.*
Salix nig. v. amygdalinus *And.*
Juncus alp. v. insignis *Fr.*
Carex lup. v. gigantea *Lord.*
Hierochloa borealis *R. & S.*

RICHARD PRESCOTT, Albany, N. Y.

Sphæropsis anomala *Pk.*

E. C. HOWE, M. D., NEW BALTIMORE, N. Y.

Fedia radiata *Michx.*
F. umbilicata *Sulliv.*
Dicranum spurium *Hedw.*
Trichobasis Galii *Lev.*
Lecythea Rosæ *Lev.*
Pileolaria brevipes *B. & R.*
Uromyces Polygoni *Fuckel.*
Polyporus porosus *Fr.*
Æcidium aroid. v. Caladii *Schw.*
Erineum quercinum *Kze.*
Arthonia Lecideëlla *Nyl.*
Biatora exigua *Fr.*
Collema cyrtaspes *Tuck.*

C. S. Osborn, Rochester, N. Y.

Anemone nemorosa *L.*
Aquilegia Canadensis *L.*
Cardamine rhom. v. purpurea *Torr.*
Dentaria laciniata *Muhl.*
Arabis lyrata *L.*
Polanisia graveolens *Raf.*
Viola rostrata *Pursh.*
Hypericum Kalmianum *L.*
Saxifraga Virginiensis *Michx.*
Tiarella cordifolia *L.*
Houstonia purp. v. ciliolata *Gr.*
Liatris cylindracea *Michx.*
Aster ptarmicoides *T. & G.*
Erigeron bellidifolium *Muhl.*
Lobelia Kalmii *L.*
Arctostaphylos Uva-Ursi *Spreng.*
Pyrola secunda *L.*
Chimaphila umbellata *Nutt.*
Couopholis Americana *Wallr.*
Pedicularis Canadensis *L.*
Mentha viridis *L.*
M. piperita *L.*
Asclepias tuberosa *L.*
A. quadrifolia *Jacq.*
A. verticillata *L.*
Shepherdia Canadensis *Nutt.*
Comandra umbellata *Nutt.*
Sisyrinchium Bermudiana *L.*
Pellæa atropurpurea *Lk.*
Cheilanthes lanuginosa *Nutt.*
Camptosorus rhizophyllus *Lk.*
Asplenium Trichomanes *L.*

C. F. Austin, Closter, N. J.

Sticta crocata *Ach.*
Ephebe pubescens *Fr.*
Lecanora rubina *Vill.*
Collema pulposum *Ach.*

Miss Mary L. Wilson, Buffalo, N. Y.

Usnea cavernosa *Tuck.*
Evernia furfuracea *Mann.*
E. vulpina *Ach.*
Ramalina calicaris *Fr.*
Physcia pulverulenta *Fr.*
P. cil. v. angustata *Tuck.*
Pannaria lurida *Mont.*
Biatora rub. v. spadicea *Tuck.*
B. rub. v. Schweinitzii *Tuck.*
Buellia alboatra *Schœr.*
Lecanora cinerea *Fr.*
Gyalecta cupularis *Schœr.*
Lecidea Russellii *Tuck.*
Pertusaria pustulata *Ach.*
Myriangium Curtisii *B. & M.*
Endocarpon arboreum *Schw.*
Trypethelium cruentum *Mont.*
Leptogium phyllocarpum *Nyl.*
L. pulchellum *Nyl.*
Collema pycnocarpum *Nyl.*
Cladonia macilenta *Hoffm.*
Stereocaulon condensatum *Hoffm.*
Parmelia colpodes *Ach.*

S. B. Woolworth, LL.D., Albany, N. Y.

Argemone Mexicana *L.*
Liatris Boykinii *T. & G.*
Cleome integrifolia *Nutt.*
Artemisia frigida *Willd.*
Chrysopsis villosa *Nutt.*

Rev. Henry A. Riley, Montrose, Pa.

Verbascum Thapsus *L.* (white flowered.)

M. S. BEBB, Fountaindale, Ill.

Draba brachycarpa *Nutt.*
D. Car. v. micrantha *Bebb.*
Lithospermum longiflorum *Spreng.*
Castilleia sessiliflora *Ph.*
Euphorbia commutata *Engelm.*

Miss SARAH P. MONK, Poughkeepsie, N. Y.

Polypodium vulgare v. Cambricum *L.*

Hon. A. S. JOHNSON, Utica, N. Y.

Agaricus bombycinus *Schæff.*
Lycoperdon cyathiformis *Bosc.*

HENRY GILLMAN, Detroit, Mich.

Wolffia Columbiana *Karst.*
W. arrhiza *L.*
Lemna minor *L.*

S. T. OLNEY, Providence, R. I.

Carex juncea *Willd.*
C. gynandra *Schw.*
C. striata *Michx.*
Carex Olneyi *Boott.*
C. polymorpha *Muhl.*

B. D. GILBERT, Utica, N. Y.

Adiantum Capillus-Junonis *Rupt.*
Cheilanthes argentea *Hook.*

FRANK B. CORNWELL, Vallejo, Cal.

Lecanora ventosa *Ach.*

Hon. G. W. CLINTON, Buffalo, N. Y.

Draba verna *L.*
Primula Mistassinica *Michx.*
Dicranum palustre *Brid.*
Orthotrichum psilocarpum *James.*
Phallus impudicus *Fr.*
Tremella mesenterica *Retz.*
T. foliacea *Pers.*
Phlebia radiata *Fr.*
Corticium salicinum *Fr.*
Trichia chrysosperma *DC.*
T. pyriformis *Hoffm.*
Stemonitis fusca *Roth.*
Leptostroma vulgare *Fr.*
Sphæronema subtile *Fr.*
Æcidium Penstemonis *Schw.*
Æ. Thalictri *Grev.*
Æ. Allenii *Clinton.*
Æ. Ranunculacearum *DC.*
Æ. Berberidis *Pers.*
Æ. Euphorbiæ-hypericifoliæ, *Schw.*
Æ. Houstoniatum *Schw.*
Æ. Gnaphaliatum *Schw.*
Æ. quadrifidum *DC.*
Æ. macrosporium *Pk.*
Æ. tenue *Schw.*
Æ. Menthæ *DC.*
Æ. Iridis *Gerard.*

Puccinia Pyrolæ *Cooke.*
P. Polygonorum *Lk.*
P. Galiorum *Lk.*
P. Cryptotæniæ *Pk.*
Uromyces appendiculata *Lev.*
U. solida *B. & C.*
U. Junci *Schw.*
Uredo Helianthi *Schw.*
U. Potentillarum *DC.*
U. Æcidioides *Pk.*
Trichobasis Labiatarum *Lev.*
Pileolaria brevipes *B. & R.*
Urnula Craterium *Schw.*
Peziza æruginosa *Fr.*
Tympanis alnea *Pers.*
Patellaria atrata *Fr.*
Sphinctrina Cerasi *B. & C.*
Cenangium Prunastri *Fr.*
Nectria appendiculata *Curt.*
Hypoxylon concentricum *Bolt.*
Xylaria digitata *Fr.*
X. Hypox. v. pedata *Fr.*
Valsa leucostoma *Fr.*
V. salicina *Fr.*
Sphæria oötheca *B. & C.*
S. gyrosa *Schw.*
S. limæformis *Schw.*
Dothidea crystallophora *B. & C.*
D. Sambuci *Fr.*
D. Ribesia *Pers.*
Glonium stellatum *Muhl.*
Erineum quercinum *Kze.*

(4)

PLANTS FOUND GROWING SPONTANEOUSLY IN THE STATE AND NOT BEFORE REPORTED.

Corydalis flavula *Raf.*
Near Paltz Point, Ulster county. *W. H. Leggett.*

Frangula Caroliniana *Gray.*
Roadside between Hunter's Point and Flushing. *Leggett.*

Linum striatum *Walt.*
Tottenville, Staten Island. *Leggett.*

Galactia mollis *Michx.*
Washington Heights, N. Y. Isl. *Leggett.*

Coronilla varia *DC.*
Lake Mohegan, near Peekskill. *Leggett.* Introduced.

Cratægus parvifolia *Ait.*
Tottenville, Staten Island. *Leggett.*

Hibiscus Trionum *L.*
Newark, Wayne county. *E. L. Hankenson.* Introduced.

Fedia radiata *Michx.*
New Baltimore. *E. C. Howe.*

Fedia umbilicata *Sulliv.*

Growing with the preceding, and scarcely to be distinguished from it except by the fruit. *Howe.*

Eupatorium pubescens *Muhl.*

Rossville, Staten Island. *Leggett.*

Crepis virens *L.*

Greenwood Cemetery, Brooklyn. Apparently well established. *J. S. Merriam.*

Sesuvium Portulacastrum *L.*

East Hampton, Long Island. *Merriam.*

Mentha aquatica v. crispa *Benth.*

Lake Mohegan; also near Middletown, Orange county. *Leggett.*

Carex capillaris *L.*

Otter Creek, Onondaga county. *S. N. Cowles.* A remarkably tall slender variety, with the perigynia two-nerved.

MOSSES.

Dicranum palustre *Brid.*

Whirlpool, Erie county. *G. W. Clinton.*

Orthotrichum psilocarpum *James.*

Trees. Harlem. *Clinton.*

LICHENS.

Cetraria pinastri *Fr.*

Catskill mountains. Sterile.

Cetraria nivalis *Ach.*

Top of Mount Marcy.

Sticta crocata *Ach.*

Shawangunk mountains. *C. F. Austin.*

Pannaria lurida *Mont.*

Trees. Buffalo. *Miss Mary L. Wilson.*

Lecidea Russellii *Tuck.*

Rocks. Niagara Falls. *Miss Wilson.*

PARMELIA COLPODES *Ach.*

Buffalo. *Miss Wilson.*

LECANORA VENTOSA *Ach.*

Rocks. Top of Mounts Marcy and of Whiteface.

LECANORA RUBINA *Ach.*

Rocks. Haverstraw, Rockland county. *Austin.*

BIATORA LUCIDA *Fr.*

Roots of overblown trees. Sandlake, Rensselaer county. A rare species.

BIATORA EXIGUA *Fr.*

Bark of living trees. Very common.

BUELLIA ALBOATRA *Schœr.*

Bark of trees. Buffalo. *Miss Wilson.*

CLADONIA MACILENTA *Hoffm.*

Eighteen-mile Creek. *Miss Wilson.*

PERTUSARIA PUSTULATA *Ach.*

Trees. Buffalo. *Miss Wilson.*

PYRENULA LEUCOPLACA *DC.*

Trees. Helderberg mountains.

ARTHONIA ASTROIDEA *Ach.*

Trees. New Baltimore. *Howe.* Albany and Sandlake.

ARTHONIA LECIDEËLLA *Nyl.*

Trees. New Baltimore. *Howe.*

ENDOCARPON ARBOREUM *Schw.*

Trees. Buffalo. *Miss Wilson.*

UMBILICARIA PENNSYLVANICA *Hoffm.*

Rocks. Garrison's Station, Putnam county. Several species of Umbilicaria grow in great profusion on the exposed rocks of the Highlands.

CONIOCYBE FURFURACEA *Ach.*

Roots of overblown trees. Sandlake.

Collema pycnocarpum *Nyl.*

Mossy trunks of trees. Buffalo. *Miss Wilson.*

Collema pulposum *Ach.*

Rocky banks, Herkimer county. *Austin.*

Collema cyrtaspes *Tuck.*

Rocks. New Baltimore. *Howe.*

Leptogium pulchellum *Nyl.*

Rocks and trees. Buffalo. *Miss Wilson.* New Baltimore, *Howe.* Catskill mountains.

Myriangium Curtisii *B. & M.*

Branches of Cratægus, Buffalo. *Miss Wilson.*

Ephebe pubescens *Fr.*

Rocks. Haverstraw. *Austin.* Top of Mount Marcy.

Stereocaulon condensatum *Hoffm.*

Niagara Falls. *Miss Wilson.*

Gyalecta cupularis *Schær.*

Rocks. Niagara Falls. *Miss Wilson.*

FUNGI.

Agaricus rubescens *Pers.*

Grassy ground in open woods. Greenbush. July. The change of color in the flesh when bruised is not well marked in our specimens.

Agaricus (Amanita) volvatus *n. sp.*

Pileus fleshy, convex, at length expanded, striate on the margin, sprinkled with small floccose scales, whitish, the disk pale brown; lamellæ close, free, white; stem equal or slightly tapering upward, stuffed, minutely floccose-scaly, ringless, whitish; volva large, firm, loose; spores subelliptical $\frac{1}{2500}$ of an inch long. Plant 2–3 inches high, pileus as broad, stem 3–4 lines thick.

Damp ground in open woods. Greenbush. July.

A species well marked by the absence of the annulus and the presence of a large, thick, bulb-like volva, whose free margin is more or less lobed. The lamellæ in the dried specimens have assumed a pale cinnamon hue.

Agaricus Schumacheri *Fr.*

Ground in woods. Greig, Lewis county. September. This plant when old assumes the appearance of a large *Clitocybe.*

Agaricus equestris *L.*

Ground in pine woods. Bethlehem, Albany county. November. This is the form with a white stem. The lamellæ in our specimens are not entirely free, but deeply emarginate and attached to the stem by a very narrow part.

Agaricus (Tricholoma) Trentonensis *n. sp.*

Pileus thin, convex or expanded, often irregular, smooth or subvirgate, hygrophanous, slightly striatulate on the margin when moist, dingy white, the disk generally brown; lamellæ very narrow, crowded, obscurely emarginate, white inclining to yellowish; stem short, equal, solid, slightly striate, white.

Plant 1.5′–2′ high, pileus 1′–2′ broad, stem 3″–5″ thick.

Ground and rotten wood in woods. Trenton Falls. September. Gregarious or subcæspitose, sometimes closely crowded.

Agaricus (Tricholoma) Sienna *n. sp.*

Pileus rather thin, convex, then expanded or slightly depressed, smooth, hygrophanous, obscurely striatulate on the extreme margin when moist, yellowish red; lamellæ moderately close, whitish; stem equal, smooth, hollow, concolorous with the pileus.

Plant 2′–3′ high, pileus 1′–2′ broad, stem 3″–4″ thick.

Ground in woods. Greig. September.

The pileus has the color of burnt sienna, and the coloration of the whole plant resembles that of *Hydnum repandum.*

Agaricus (Tricholoma) chrysenteroides *n. sp.*

Plant light yellow; pileus fleshy, convex or expanded, firm, smooth, dry; lamellæ close, attached, slightly ribbed along the upper margin with transverse veinlets; stem firm, equal, smooth, solid; spores elliptical, $\frac{1}{2500}$′ long.

Plant 2′–4′ high, pileus 1′–2′ broad, stem 3″–4″ thick.

Ground in woods. Greig. September.

Perhaps too near *A. chrysenterus*, but the lamellæ are attached to the stem, not free, and the pileus is without any umbo.

Agaricus (Clitocybe) Hoffmani *n. sp.*

Pileus fleshy, thin, convex, then funnel-form, umbilicate, hygrophanous, watery yellow when moist, yellow when dry; lamellæ broad, distant, decurrent, bright yellow, interspaces rugose; stem equal, smooth, stuffed or hollow, yellow; spores elliptical, $\frac{1}{2500}'$ long.

Plant 1′–2′ high, pileus 8″–18″ broad, stem 1″ thick.

On much decayed wood in woods. Greig. September.

It differs from *A. bellus* by its smooth pileus and decurrent lamellæ. I wish this pretty little plant to bear the name of Gov. John T. Hoffman, because of his high appreciation of Natural History and his just regard for its interests.

AGARICUS FRAGRANS *Sow.*

Ground in woods. Greig. September.

AGARICUS CALATHUS *Buxb.*

Low grounds in woods. Sandlake. Well marked by the peculiar violaceous colored lamellæ.

AGARICUS (CLITOCYBE) MARMOREUS *n. sp.*

Pileus fleshy, firm, convex, smooth, white, mottled with darker watery spots; lamellæ close, narrow, arcuate, unequally decurrent, white; stem firm, solid, long, generally curved and slightly thicker at the base, white, pruinose; spores globose, $\frac{1}{6000}'$ long.

Plant cæspitose, 4′–6′ high, pileus 2′–4′ broad, stem 6″–10″ thick.

On old logs in woods. Greig. September.

This species is allied to *A. illudens*, but is very different in color and is destitute of an umbo.

AGARICUS (CLYTOCYBE) ECTYPOIDES *n. sp.*

Pileus fleshy, thin, broadly umbilicate or funnel-form, with a spreading margin, finely virgate with close-pressed blackish fibrils, and squamulose-punctate, the black points seated on the radiations, varying in color from watery-gray to dull watery-yellow; lamellæ close, narrow, long decurrent, some of them forked, yellowish; stem equal, firm, solid, colored like the pileus, with a white mycelium at the base.

Plant about 2′ high, pileus 1′–2′ broad, stem 1″–2″ thick. Subcæspitose.

Rotten logs and stumps in woods. Sandlake and Catskill mountains. July and August.

The pileus is sometimes lobed, sometimes excentric.

AGARICUS (COLLYBIA) ZONATUS *n. sp.*

Pileus thin, fleshy, convex, then expanded or slightly depressed, umbilicate, hairy-tomentose, tawny with obscure darker zones;

lamellæ narrow, close, white, free; stem equal, firm, hollow, tomentose-fibrillose, brownish-tawny; spores subelliptical, $\frac{1}{5000}'$ long.

Plant cæspitose, 1.5′–2′ high, pileus 6″–12″ broad, stem 1″ thick. Base of an elm tree. Albany. August.

Allied to *A. stipitarius*, but a much larger plant with a different mode of growth. Under a lens the pileus is seen to be clothed with rather coarse, densely matted, subfasciculate, prostrate, tawny hairs. In the dried specimens the darker zones are less clear, and the pileus has become concentrically sulcate. A minute umbo or papilla is seen in the umbilicus in some specimens.

AGARICUS CLUSILIS *Fr.*

Burnt ground in woods. Greig. September.

AGARICUS (COLLYBIA) SPINULIFER *n. sp.*

Pileus fleshy, thin, convex, smooth, hygrophanous, alutaceous tinged with pink and slightly striatulate on the margin when moist, paler when dry; lamellæ narrow, close, rounded behind and free, pale cinnamon colored; stem slender, tough, smooth, shining, hollow, reddish-brown, paler above, with a whitish mycelium at the base; spores subelliptical, $\frac{1}{4500}'$ long.

Plant cæspitose, 2′–3′ high, pileus 1′–1.5′ broad, stem 1″ thick. Old logs and ground among leaves in woods. Greig. September. (Plate 1, figs. 4–9.)

The lamellæ are clothed with minute spines or setæ, of a dull cinnamon color, about $\frac{3}{1000}'$ long, thickest near the base and gradually tapering to the point. These give to the lamellæ their peculiar hue. In young plants the stem is whitish nearly to the base.

AGARICUS (COLLYBIA) SIMILLIMUS *n. sp.*

Size and habit exactly as in the preceding species for which it is liable to be mistaken. The pileus becomes lighter colored (almost white) in drying, the lamellæ are white, attached to the stem and destitute of the spine-like processes which form such a remarkable feature in its near ally, and the stem is of a uniform reddish-brown color.

Greig. September.

AGARICUS LEAIANUS *Berk.*

Decaying beech logs and branches in woods. Buffalo. *Clinton.* Sandlake, Helderberg and Adirondack mountains. July, September.

An extremely beautiful plant when young and fresh, but it loses its color in drying. It grows in dense tufts, and when young, both pileus and stems are sprinkled with a yellow pulverulent coating. When old, the plant becomes much faded. The fingers are stained in handling it. The lamellæ in our specimens were yellow with an orange-colored edge. Spores ellipitical, $\frac{1}{2500}$′ long.

Agaricus hæmatopus *Pers.*

Old logs in woods. Garrisons. Greig, etc. June, September.

Agaricus Tintinnabulum *Fr.*

On an old beech stump. Knowersville, Albany county. May.

Agaricus (Mycena) leptophyllus *n. sp.*

Pileus thin, campanulate or convex, subpapillate, smooth, striatulate when moist, pale reddish-yellow, the disk brighter colored; lamellæ close, narrow, widest at the middle, pointed at the outer extremity, sharply uncinate at the inner, whitish or yellow with a flesh-colored tint; stem slender, tough, hollow, smooth, whitish.

Plant 1′–1.5′ high, pileus 3″–5″ broad, stem .5″ thick.

Old mossy logs and rotton wood in woods. Greig. September.

The papilla of the pileus is sometimes absent.

Agaricus (Omphalia) Fibuloides *n. sp.*

Pileus fleshy but thin, convex, deeply umbilicate, smooth, hygrophanous, dull orange-colored and striatulate when moist, paler when dry; lamellæ rather close, arcuate, long-decurrent, venose-connected, white; stem equal, smooth, hollow, nearly the same color as the pileus, with a white mycelium at the base; spores subelliptical, $\frac{1}{3000}$′ long.

Plant 1′–2′ high, pileus 6″–10″ broad, stem scarcely 1″ thick.

Burnt mossy ground in a pasture. Greig. September.

It resembles *A. Fibula* in its coloration, but its larger size, short stem, and venose-connected lamellæ readily distinguish it.

Agaricus (Omphalia) lilacinus *n. sp.*

Pileus submembranaceous, convex, deeply umbilicate, smooth, viscid, hygrophanous, dull yellow with a slight greenish tinge and striatulate when moist, bright sulphur-yellow when dry; lamellæ rather close, arcuate, decurrent, pale lilac; stem equal, smooth, hollow, viscid, yellowish with a pale lilac-colored mycelium at the base.

Plant about 1′ high, pileus 6″–9″ broad, stem .5″ thick.

Old logs in woods. Trenton Falls. Sept. (Plate 1, figs. 10–13.)

A very distinct species, remarkable for the peculiar hue of the lamellæ and the mycelium. The color of the latter is retained in the dried specimens before me.

Agaricus pyxidatus *Fr.*

Ground in pastures. Greig. September.

Agaricus ulmarius *Fr.*

Elm trees. Trenton Falls. September.

I have what appears to be a form of this species, with the pileus destitute of spots and the lamellæ deeply emarginate. It grows in large tufts from the roots of maple trees.

Agaricus porrigens *Fr.*

Rotten wood in woods. Common in the North woods. September, October.

Agaricus (Pluteus) admirabilis *n. sp.*

Pileus rather thin, convex, broadly umbonate, glabrous, rugose-reticulated, hygrophanous, obscurely striatulate on the margin when moist, bright yellow; lamellæ close, broad, remote, dull yellowish, then flesh colored; stem slender, smooth, hollow, equal or slightly thickened at the base, yellow, with a white mycelium; spores subglobose, $\frac{1}{4000}'$ long.

Plant 1.5′–2′ high, pileus 6″–10″ broad, stem scarcely 1″ thick.

Old logs in woods. Greig. September.

Near *A. chrysophlebius* from which it is separated by the umbonate, hygrophanous, uniformly yellow pileus, differently colored, lamellæ and stem not enlarged above.

Agaricus sericellus *Fr.*

Ground in woods. Catskill mountains. July.

Agaricus (Entoloma) Grayanus *n. sp.*

Pileus fleshy, convex, frequently wavy or irregular, hygrophanous, dull watery yellow when moist, smooth, shining and nearly white when dry; lamellæ plane, close, flesh colored; stem equal, firm, solid, white; spores subglobose, irregular $\frac{1}{3000}'$ long.

Plant gregarious, 2′–3′ high, pileus 1.5′–2′ broad, stem 3″–5″ thick.

Ground in old roads. Sandlake. August.

Dedicated to Prof. A. Gray, in view of his eminent position as a botanical writer.

Agaricus (Entoloma) cuspidatus *n. sp.*

Pileus thin, conical or subcampanulate, smooth, shining, bearing an elongated papilla or cusp at the apex, the margin often irregular; lamellæ broad, subdistant, narrowed toward the stem, slightly emarginate and attached, more or less denticulate on the edge, usually terminating a little before the margin; stem equal, hollow, fibrous, often twisted; spores subglobose, irregular, $\frac{1}{2000}$′ in diameter.

Plant pale yellow throughout, 3′–5′ high, pileus 9″–12″ broad, stem 1″–1.5″ thick.

Swamps and sphagnous marshes. Sandlake. August. (Plate 2, figs. 14–18.)

Apparently closely allied to *A. Murraii*, but the pileus is not striate, and is distinguished by a remarkable cusp. The spores are a little larger than in *A. Murraii*.

AGARICUS (ENTOLOMA) SALMONEUS *n. sp.*

Pileus thin, conical or campanulate, subacute, rarely with a minute papilla at the apex, smooth, of a peculiar soft ochraceous color, slightly tinged with salmon or flesh color; lamellæ and stem colored like the pileus.

Low grounds, under spruce trees and in swamps. Sandlake. August. (Plate 4, figs. 6–9.)

It is with some hesitation that this is proposed as a species, its resemblance to the preceding one is so close. The only difference is found in its color and in the absence of the prominent cusp of that plant. In both species the pileus is so thin, that in well dried specimens, slender, dark, radiating lines on it, mark the position of the lamellæ beneath, although in the living plants these are not visible.

AGARICUS (CLITOPILUS) WOODIANUS *n. sp.*

Pileus fleshy, thin, convex or expanded, umbilicate or centrally depressed, hygrophanous, striatulate on the margin when moist, whitish or yellowish-white and shining when dry, the margin often wavy or flexuous; lamellæ close, adnate-decurrent, whitish, then flesh colored; stem equal, flexuous, shining, colored like the pileus, solid or hollow from the erosion of insects; spores subglobose, irregular, $\frac{1}{3500}$′ long.

Plant 3′ high, pileus 1′–2′ broad, stem 2″ thick.

Ground and old logs in woods. Greig. September.

It resembles *A. Grayanus* in color, but is easily distinguished from it by the more slender habit and the character of the lamellæ. Dedicated to Prof. A. Wood, in view of his exalted position as a botanist, and of the many acts of kindness the writer has received from him.

AGARICUS ABORTIVUS *B. & C.*

Ground in woods and copses. Greig and Greenbush. September and October.

The lamellæ are arcuate and long-decurrent in some specimens, nearly plane and adnate-decurrent in others. They are at first grayish with a flesh colored tint, at length bright flesh colored; some of them are forked. The odor is like that of fresh meal, the taste not unpleasant. I have partaken of it without any injurious effects, and deem it edible, though not as pleasant as some. The abortive form sometimes grows intermingled with the others, sometimes alone.

AGARICUS (CLITOPILUS) SEYMOURIANUS *n. sp.*

Pileus fleshy, thin, broadly convex, sometimes a little depressed, smooth, pruinose, whitish with a dark lilac tinge; lamellæ narrow, crowded, decurrent, some of them forked at the base, whitish with a dull flesh colored tint; stem equal, silky-fibrillose, hollow; spores globose, minute, $\frac{1}{4000}$' long.

Plant gregarious, 2'-3' high, pileus 1'-2.5' broad, stem 3''-4'' thick. Ground in woods. Greig. September. The pileus is sometimes lobed and excentric.

I take pleasure in naming this species for Hon. Horatio Seymour, in view of the interest he has manifested in the study of fungi.

AGARICUS ASPRELLUS *Fr.*

Swamps and sphagnous marshes. Sandlake. August.

AGARICUS SCABROSUS *Fr.*

Swamps. Sandlake. August.

AGARICUS (NOLANEA) CONICUS *n. sp.*

Pileus submembranaceous, conical, at length expanded, with a minute umbo or papilla, hygrophanous, dull watery cinnamon color and striatulate when moist, silky shining, subconate and pale grayish cinnamon when dry; lamellæ close, rather narrow, nearly free, terminating before the margin of the pileus, bright flesh color; stem slender, straight, hollow, brown with white mycelium at the base; spores subovate, irregular, $\frac{1}{3000}$' long.

Plant 2' high, pileus 4''-10'' broad, stem .5'' thick. Among moss and on rotten wood in swamps. Sandlake. August.

AGARICUS (NOLANEA) DELICATULUS *n. sp.*

Pileus submembranaceous, convex, then expanded, smooth, hygrophanous, striatulate when moist, silky when dry, pinkish white; lamellæ subdistant, rather broad, ventricose, slightly attached, white, then flesh-colored; stem long, slender, smooth, hollow, subpellucid, white; spores subelliptical, irregular, $\frac{1}{2500}'$ long.

Plant fragile, 2–3' high, pileus 6" broad, stem .5" thick. Sphagnous swamps. Sandlake. August.

AGARICUS (NOLANEA) CLINTONIANUS *n. sp.*

Pileus submembranaceous, broadly conical, sometimes expanded and wavy margined, a little scabrous-squamulose on the disk, striate on the margin, whitish or light gray, the disk sometimes a little darker; lamellæ narrow, close, nearly free or easily separating from the stem, whitish, becoming pale flesh-colored; stem slender, equal, smooth, hollow, white, sometimes slightly tinged with yellow, with an abundant white mycelium at the base; spores subelliptical, irregular, $\frac{1}{2500}'$ long.

Plant 2–4' high, pileus 1–1.5' broad, stem scarcely 1" thick. Swamps. Sandlake. August.

I take pleasure in naming this apparently rare species for Hon. G. W. Clinton, one of the most energetic and enthusiastic botanists of the State.

AGARICUS FLAMMANS *Fr.*

Old logs in woods. Greig. September. A most beautiful plant, preserving its color well in drying.

AGARICUS SQUARROSUS *Mull.*

Prostrate trunks of deciduous trees. Sandlake. August and September.

AGARICUS HETEROCLITUS *Fr.*

On an old beech log. Greig. September.

AGARICUS (PHOLIOTA) AGGERICOLA *n. sp.*

Pileus convex, at length slightly depressed, smooth, viscid in wet weather, slightly striatulate on the margin when moist, dark brown; lamellæ subdistant, decurrent-toothed, grayish; stem equal or slightly tapering upward, fibrous, solid, usually curved at the base, lighter colored than the pileus, white above the membranous annulus; spores elliptical, $\frac{1}{2500}'$ long.

Plant 2–3' high, pileus 1'–2' broad, stem 3"–5" thick. Banks by roadsides. Greig. September.

AGARICUS (NAUCORIA) HIGHLANDENSIS *n. sp.*

Pileus convex, sometimes expanded, smooth, viscid, yellowish-red, often paler on the margin; lamellæ close, rounded behind, sometimes with a slight decurrent tooth, at length pale cinnamon color; stem equal, hollow, minutely floccose-scaly, yellowish; spores $\frac{1}{3000}$′ long.

Plant gregarious, 1′–1.5′ high, pileus 6″–12″ broad, stem 1″ thick. Burnt ground. Top of one of the "Highlands," near Highland Falls. June.

Allied to *A. semiorbicularis*, but easily separated from it by its more viscid pileus, paler lamellæ, squamulose stem and smaller spores.

Agaricus (Hebeloma) illicitus *n. sp.*

Pileus fleshy, firm, broadly convex or expanded, smooth, hygrophanous, very dark brown when moist, a little paler when dry; lamellæ close, broad, tapering outwardly, plane or ventricose, rounded behind with a very slight decurrent tooth, pale dingy brown; stem firm, equal, hollow, scabrous, distinctly striate at the top, paler than the pileus, with a white mycelium; spores subelliptical, $\frac{1}{4000}$′ long.

Plant compact, gregarious or cæspitose, 1.5′–2′ high, pileus 1′–1.5′ broad, stem 2″ thick. Rotten sticks and logs in woods. Greig. September. (Plate 4, Figs. 1–5.) The habitat is unusual for species of this subgenus.

Agaricus (Hebeloma) Ascophorus *n. sp.*

Pileus convex, smooth, viscid, pale alutaceous, often with a brighter colored disk; lamellæ moderately broad, close, emarginate, attached, pallid or subolivaceous, stem equal, short, stuffed or hollow, slightly fibrillose, paler than the pileus; spores produced in fragile, globose asci borne on a thick, tapering, penetrating peduncle, elliptical, $\frac{1}{3500}$′ long.

Plant 1′ high, pileus 6″–12″ broad, stem scarcely 1″ thick. Burnt ground in pastures. Greig. September. (Plate 3, Figs. 1–6.)

A species remarkable for the peculiar manner in which the spores are produced. There are a dozen or more in each ascus. Under slight pressure on the slide of the microscope the enveloping membrane bursts and separates from its peduncle which is of a firmer structure and bears some resemblance in size, shape and color to the spinules on the lamellæ of *A. spinulifer*. The viscid pellicle of the pileus is separable when dry.

Agaricus (Hebeloma) excedens *n. sp.*

Pileus thin, convex, gibbous or broadly umbonate, pale alutaceous inclining to russet; lamellæ rather broad, close, deeply emarginate, terminating before the margin, minutely eroded on the edge, pallid, then brownish; stem equal, solid, silky-fibrillose, colored like the pileus; spores subelliptical, $\frac{1}{3500}'$ long.

Plant 2′ high, pileus 1′ broad, stem 1″–2″ thick. Sandy soil about pine trees. Saratoga. October.

Readily known by the thin margin extending beyond the lamellæ. It has the taste and odor of radishes.

Agaricus (Hebeloma) mutatus *n. sp.*

Pileus thin, firm, convex or broadly conical, gibbous or broadly umbonate, rough with squarrose fasciculate, floccose scales, which at length disappear except on the disk, dark brown; lamellæ broad, close, rounded and very deeply emarginate behind, attached by the extreme upper part only, dark ferruginous brown, edge whitish; stem slender, equal, solid, firm, floccose-scaly, often curved at the base, colored like the pileus; spores elliptical, $\frac{1}{2500}'$ long.

Plant 2′–3′ high, pileus 6″–12″ broad, stem 1″ thick. Damp ground in woods. Catskill mountains. July.

The changed appearance produced by the disappearance of the scales suggests the specific name.

Agaricus (Crepidotus) dorsalis *n. sp.*

Pileus fleshy, sessile, dimidiate or subreniform, flat or slightly depressed behind, with a decurved slightly striate margin, slightly fibrillose-tomentose, distinctly tomentose at the point of attachment, reddish yellow; lamellæ close, ventricose, rounded behind, subemarginate, converging to a whitish, villous, lateral space, pale ochraceous brown; spores globose, $\frac{1}{4000}'$ in diameter.

Pileus 8″–15″ broad. Old logs in woods. Greig. September.

Allied to *A. putrigena* B. & C., but it is not imbricated, and differs in color, size of spores, etc. In general appearance it bears some resemblance to *Panus dorsalis*.

Agaricus mollis *Schœff.*

Old logs and rotten wood. Common. July, September.

Agaricus variabilis *Pers.*

Dead trunks of mountain maple, *Acer spicatum*. Indian Lake, Hamilton county. October.

Agaricus haustellaris *Fr.*

On prostrate trunks of poplars. Thurman, Warren county. October. A small form.

Agaricus (Crepidotus) Greigensis *n. sp.*

Pileus submembranaceous, convex, dimidiate, hygrophanous, grayish cinnamon color and striatulate when moist, silky-fibrillose when dry; lamellæ subdistant, free, grayish or pallid becoming dingy flesh-colored; stem lateral, short, solid, curved, fibrillose toward the base, springing from an abundant, white, radiating mycelium which sometimes creeps over the matrix to a considerable distance; spores subglobose, irregular, flesh-colored, about $\frac{1}{3000}$′ long.

Pileus 5″–10″ broad, stem scarcely more than 1″ long. Very rotten, mossy logs in woods. Greig. September.

The short stem is sometimes compressed in the middle so that it appears to be enlarged both above and below. This species belongs to the second division of the subgenus *Crepidotus* as characterized by Fries in the Epicrisis, and to the subgenus *Claudopus* proposed by W. G. Smith, except that the lamellæ are free, neither sinuate nor decurrent. It is manifestly related to *A. byssisedus.*

AGARICUS (PILOSACE) EXIMIUS *n. sp.*

Pileus fleshy, thin, convex or broadly campanulate, at length expanded and subumbonate, smooth, dark sooty brown; lamellæ close, broad, ventricose, rounded behind, free, dull red or brownish pink, then brown; stem slender, hollow, a little thicker at the base, dull red; spores elliptical, $\frac{1}{4000}$′ long.

Plant 1′ high, pileus 3″–6″ broad, stem .5″ thick. Old stumps in woods. Greig. September. Rare.

I am not aware that a representative of this subgenus has before been found in this country, and none is yet known to belong to the flora of England.

AGARICUS (PSILOCYBE) LIMICOLA *n. sp.*

Pileus thin, convex, then expanded, smooth, hygrophanous, dark watery brown and striatulate on the margin when moist, pale ochraceous brown and corrugate-wrinkled when dry; lamellæ close, rounded behind, attached, cinnamon-brown, becoming darker; stem slender, equal, brittle, silky, hollow above with a distinct separable pith below, whitish; spores elliptical-cymbiform, $\frac{1}{2500}$′ long.

Plant subcæspitose, 2′ high, pileus 6″–12″ broad, stem scarcely 1″ thick. Damp muck soil in woods. Greig. September. (Plate 2, figs. 9–13.)

Related to *A. cernuus*, but more slender and fragile, with a different habitat, larger spores, etc.

AGARICUS (PSATHYRELLA) ODORATUS *n. sp.*

Pileus thin, fragile, ovate-convex, at length expanded, smooth, hygrophanous, dark reddish brown or chestnut colored and striatulate on the margin when moist, dirty white or clay colored with a pinkish tinge, subatomaceous and radiately wrinkled when dry; lamellæ close, broad, attached, with a slight spurious decurrent tooth, dingy flesh color, then rosy brown, finally black with a whitish edge; stem pallid, equal, hollow, slightly enlarged at the base, slightly mealy and striate at the top, subfibrillose when young, with a white mycelium at the base; spores elliptical cymbiform, $\frac{1}{1700}'$ long.

Plant 2′–3′ high, pileus 1′–2′ broad, stem 1″–2″ thick. About manure heaps. West Albany. May.

It is gregarious or subcæspitose, and has a strong odor resembling that of the "poison elder," *Sambucus pubens.* The pileus is sometimes split on the margin and occasionally cracked on the surface.

COPRINUS RADIATUS *Bolt.*

Horse dung. Sandlake. August.

COPRINUS SILVATICUS *n. sp.*

Pileus membranaceous, with a thin fleshy disk, convex, plicate-striate on the margin, dark brown, the depressed striæ paler; lamellæ subdistant, narrow, attached to the stem, brownish; stem fragile, slender, smooth, hollow, white; spores gibbous-ovate, $\frac{1}{2000}'$ long.

Plant 2′ high, pileus 6″–10″ broad, stem .5″ thick. Ground in woods. Greig. September. (Plate 4, figs. 10–14.)

The striæ extend about half way up the pileus. Allied to *C. plicatilis* and *C. ephemeris.*

COPRINUS SEMILANATUS *n. sp.*

Pileus submembranaceous, broadly conical, then expanded and strongly revolute, with the margin sometimes split, farinaceo-atomaceous, finely and obscurely rimose-striate, pale grayish brown; lamellæ narrow, close, free; stem elongated, fragile, hollow, slightly tapering upward, white, the lower half clothed with loose cottony flocci which rub off easily, the upper half smooth or slightly farinaceous; spores broadly elliptical, $\frac{1}{2000}'$ long,

Plant very fragile, 4′–6′ high, pileus 8″–12″ broad, stem 1″ thick at the base. Rich ground and dung. Sandlake. August. (Plate 4, figs. 15–18.) Allied to *C. coöpertus.*

BOLBITIUS NOBILIS *n. sp.*

Pileus thin, fleshy on the disk, ovate, then campanulate, smooth, plicate-striate, pale yellow, the disk tinged with red, the margin at length recurved and splitting; lamellæ sub-distant, tapering outwardly, attached, the alternate ones more narrow, pale yellow with a darker edge; stem long, equal, smooth, striate at the top, hollow, white.

Plant cæspitose, 3′–5′ high, pileus 1′ broad, stem 1″ thick. Ground in woods. Greig. September. (Plate 2, figs. 1–4.)

A fine large species but probably rare.

CORTINARIUS (PHLEGMACIUM) CORRUGATUS *n. sp.*

Pileus fleshy, broadly campanulate or convex, smooth, viscid, coarsely reticulate-rugose, bright yellow, the margin incurved; lamellæ close, a little narrowed behind, attached, minutely eroded on the edge, pallid, then pale cinnamon; stem stout, cylindrical, smooth, hollow, bulbous, whitish or pale yellow, the bulb viscid and colored like the pileus; spores subglobose or broadly elliptical, echinulate, $\frac{1}{2200}'$–$\frac{1}{2000}$, long.

Plant 3′–5′ high, pileus 2′–3′ broad, stem 6″–8″ thick. Ground among leaves under *Kalmia latifolia.* Highlands. June.

The flesh is white; the bulb immarginate, in some specimens almost obsolete. A very distinct, noble species.

CORTINARIUS (PHLEGMACIUM) OLIVACEUS *n. sp.*

Pileus fleshy, convex, then expanded, smooth, viscid, dark brown with a greenish or olivaceous tinge; lamellæ close, rather broad, at length ventricose, dark olivaceous, then cinnamon colored; stem equal, bulbous, silky, stuffed or hollow, white-violaceous; spores elliptical, with a transparent nucleus, $\frac{1}{2500}'$ long.

Plant 3′–4′ high, pileus 2′ broad, stem 4″–6″ thick. Ground in woods. Greig. September.

The flesh of the stem is violaceous, of the pileus grayish.

CORTINARIUS BOLARIS *Fr.*

Ground in woods. Greig. September.

CORTINARIUS (INOLOMA) ASPER *n. sp.*

Pileus fleshy, firm, hemispherical, then convex, rough with minute, erect, brown scales, ochraceous; lamellæ close, rounded behind and slightly emarginate, dull violaceous, then pale cinnamon; stem equal, bulbous, solid, fibrillose-scaly, colored like the pileus but smooth and violaceous at the top, the bulb white with an abundant mycelium; spores broadly elliptical, with a pellucid nucleus, $\frac{1}{3000}'$ long.

Plant 3′–4′ high, pileus 2′–3′ broad, stem 3″–5″ thick. Ground in cleared places. Greig. September. (Plate 1, figs. 1–3.) A fine species. The flesh of the stem is violaceous.

Cortinarius evernius *Fr.*

Low wet grounds in woods. Sandlake. August. Our specimens do not quite agree with the description, the stem being silky-fibrillose, not scaly.

Gomphidius viscidus *Fr.*

Ground in pine woods. Sandlake and West Albany. October.

Hygrophorus puniceus *Fr.*

Ground in woods. Greig. September.

Hygrophorus lætus *Fr.*

Ground in cleared places, growing under *Pteris aquilina*. Greig. September.

Hygrophorus psittacinus *Fr.*

Ground in open places. Greig. September.

Lactarius insulsus *Fr.*

Damp ground in open woods. Greenbush. July.

Lactarius trivialis *Fr.*

Ground in woods. Poughkeepsie. *W. R. Gerard.* Greig. September.

Our plant does not agree rigidly with the description, the pileus being sometimes zonate and the stem rather slender and not always hollow. The lamellæ and flesh slowly change to a greenish or olivaceous color when wounded, though the milk is unchangeable. Future observation may show it to be a distinct species, but at present I prefer to consider it an aberrant form of *L. trivialis.*

Lactarius cinereus *n. sp.*

Pileus fleshy, at length expanded, centrally depressed, usually umbilicate, smooth, viscid, light gray with the disk sometimes a little darker; lamellæ narrow, close, white; stem equal or slightly tapering upward, smooth, stuffed, colored like the pileus; spores $\frac{1}{3500}'$–$\frac{1}{3000}'$ in diameter. Flesh and milk white, unchangeable, taste acrid.

Plant 2′–3′ high, pileus 1′–2′ broad, stem 3″–4″ thick. Ground in woods. Sandlake and Greig. August and September. Allied to *L. vietus.*

LACTARIUS SERIFLUUS *DC.*

Swamps in woods. Sandlake and Greig. Our plant has a hollow stem and the color of burnt sienna—particulars in which it disagrees with the description of *L. serifluus;* but the scanty watery or serum-like milk is well shown by it. This is a large but very fragile species, and much subject to the attack of insects. When dry it has a decided but agreeable odor.

LACTARIUS CHELIDONIUM *n. sp.*

Pileus fleshy, firm, centrally depressed, smooth, slightly viscid, of a grayish-green color with blue and yellow tints and a few narrow zones on the margin ; lamellæ close, narrow, forked and wavy at the base, sometimes anastomosing, grayish yellow ; stem short, subequal, smooth, hollow, colored like the pileus ; spores yellowish, $\frac{1}{3000}'$ in diameter.

Plant 2′ high, pileus 2′ broad, stem 4″–6″ thick. Sandy soil about pine trees. Saratoga. October.

Taste mild, milk sparse, of a yellowish color resembling the juice of Celandine or the liquid secreted from the mouth of grasshoppers. The flesh when wounded is at first stained with a color like the milk, then changes to blue and finally to green. Closely allied to *L. deliciosus*, from which it differs in its more narrow lamellæ, differently colored milk, smaller spores, etc.

LACTARIUS FUMOSUS *n. sp.*

Pileus firm, convex, then expanded and slightly depressed in the center, smooth, dry, smoky brown, or sordid white ; lamellæ close, adnate or slightly rounded behind, white, then yellowish ; stem firm, short, smooth, stuffed, generally tapering downward ; spores distinctly echinulate, yellow, $\frac{1}{2500}'$ in diameter ; flesh and milk white ; taste at first mild, then acrid.

Plant 1.5′–2′ high, pileus 1.5′–2.5′ broad, stem 3″–5″ thick. Grassy ground in open woods. Greenbush. July.

The peculiar smoky hue of the pileus and yellow spores enable this species to be easily recognized. The flesh when wounded slowly changes to a dull pinkish color. Related to *L. fuliginosus.*

RUSSULA VIRESCENS *Fr.*

Grassy ground. Albany and Greenbush. June and July.

RUSSULA RUBRA *Fr.*

Ground in a wooded ravine. Albany Rural Cemetery. July.

RUSSULA MARIÆ *n. sp.*

Pileus fleshy, convex, subumbilicate, at length expanded and centrally depressed, minutely pulverulent, bright pink red (crimson lake), the disk a little darker, margin even; lamellæ rather close, reaching the stem, some of them forked, venose-connected, white, then yellowish, stem equal, solid, colored like the pileus except the extremities which are usually white; spores globose, nearly smooth, $\frac{1}{3000}$′ in diameter; flesh of the pileus white, red under the cuticle, taste mild.

Plant 2′ high, pileus 1.5′–2′ broad, stem 3″–6″ thick. Dry ground in woods. Catskill mountains. July.

The minute colored granules, which give the pileus a soft pruinose appearance, are easily rubbed off on paper, and water put upon the fresh specimens is colored by them.

RUSSULA SIMILLIMUS *n. sp.*

Pileus hemispherical or convex, then expanded, slightly depressed, at first or when moist viscid, the margin at length tuberculate-striate, pale ochraceous yellow, the disk usually a little brighter colored; lamellæ subequal, reaching the stem, some of them forked behind, venose-connected, yellowish from the first; stem equal or slightly tapering upward, spongy within, rarely hollow, colored like the pileus, sometimes a little paler; spores $\frac{1}{3000}$′ in diameter; taste acrid.

Plant 2′–4′ high, pileus 1′–3′ broad, stem 4″–9″ thick. Ground in woods. Greig. September.

Allied very closely to *R. fœtens*, from which it differs by the absence of any marked odor and the margin not so widely striate. I have never seen it cæspitose nor growing in cleared lands.

PAXILLUS INVOLUTUS *Batsch.*

Ground in woods. Greig and North Elba. August and September.

CANTHARELLUS CINEREUS *Fr.*

Ground in woods and shaded ravines. Albany Rural Cemetery and Greig. July, September. The form growing in the latter locality is nearly black.

PLICATURA *nov. gen.*

Hymenophorum descending into the trama. Hymenium continuous, plicæform; folds irregular or wavy, edge obtuse.

Plants of a firm coriaceous texture, reviving on the application of moisture.

This genus is related, by the obtuse edge of the folds, to *Cantharellus* on one hand, and by its texture and continuous hymenium to *Marasmius* on the other. From *Xerotus* it is separated by the irregular character of the folds. The only species at present known to me in this genus is the epiphytal species here described, though it seems to me that *Cantharellus crispus* should find a place in it as that species certainly is closely related and revives on the application of moisture.

PLICATURA ALNI *n. sp.*

Pileus thin, coriaceous, resupinate-reflexed, generally imbricated, silky-tomentulose, brownish-tawny, the margin sterile; folds narrow, irregular, interrupted, wavy or crisped, angular, white. Pileus 8″–12″ broad.

On trunks of alders. Indian Lake and Center. October.

In color and habit this plant has some resemblance to *Cantharellus crispus.* It is somewhat flabby, and in drying, the folds to some extent disappear, but they soon assume their original size and shape on the application of moisture.

MARASMIUS STRIATIPES *n. sp.*

Pileus convex, smooth, even, pale alutaceous; lamellæ rather broad, subdistant, rounded behind, attached, white; stem equal or slightly thickened at the base, firm, hollow, distinctly striate, pruinose-tomentose, whitish with an abundant white mycelium.

Plant 2′–4′ high, pileus 2′ broad, stem 2″–3″ thick. Ground among leaves in woods. Greig. September.

MARASMIUS ANOMALUS *n. sp.*

Pileus thin, convex, smooth, reddish-gray; lamellæ close, narrow, rounded behind and united with each other, free, whitish or pallid; stem equal, hollow, smooth or slightly pruinose, pallid, reddish brown at the base.

Plant 1′–2′ high, pileus .5′–1′ broad, stem 1″ thick. Sticks among leaves in woods. Catskill. July.

It resembles *M. plancus* from which it may be separated by its smooth stem and free lamellæ.

MARASMIUS PERFORANS *Fr.*

Fallen leaves of spruce trees, *Abies nigra.* Sandlake and Greig. August and September.

MARASMIUS CANDIDUS *Fr.*

Fallen leaves. Greenbush. July.

MARASMIUS PAPILLATUS *n. sp.*

Pileus submembranaceous, convex, then expanded, with a small umbo or papilla, obscurely striate on the margin, dirty white or gray, sometimes with a pinkish hue; lamellæ narrow, close, attached, with a slight decurrent tooth, white or yellowish; stem slender, firm, hollow, colored like the pileus, pruinose, deeply rooting.

Plant 1′–2′ high, pileus 4″–10″ broad, stem .5″ thick. On rotten, mossy logs in woods. Sandlake and Greig. September.

MARASMIUS DECURRENS *n. sp.*

Pileus thin, convex, minutely tomentulose, grayish or tawny; lamellæ arcuate-decurrent, subdistant, narrow, tapering toward each end, whitish with discolored edge, interspaces rugose-reticulated; stem slender, firm, equal, gray, minutely tomentulose.

Plant subcæspitose, 1′–2′ high, pileus 4″–6″ broad, stem .5″ thick.

Ground in a shaded ravine. Albany Rural Cemetery. July.

A species remarkable for the peculiar characters of the lamellæ. It is apparently allied to *M. clavæformis.*

MARASMIUS PULCHERRIPES *n. sp.*

Pileus membranaceous, campanulate, obtuse, distantly striate, dry, smooth, of a soft maroon or vinous red color; lamellæ few, distant, narrow, ascending, free; stem tough, smooth and shining, brownish-black, clear red at the top.

Plant 1′–1.5′ high, pileus 2″–4″ broad, stem not half a line thick.

Sticks and acerose leaves among moss in woods. Garrisons. June. (Plate 4, figs. 19–22.)

The transition from the black to the red portion of the stem is sudden and well defined. The free space at the inner extremity of the lamellæ is red like the apical part of the stem.

MARASMIUS FILOPES *n. sp.*

Pileus membranaceous, convex, distantly and obscurely radiate-striate, subumbilicate, white; lamellæ few, distant, attached, white; stem smooth, elongated, thread-like, flexuous, inserted, whitish, sometimes brownish at the base.

Plant gregarious, 1′–1.5″ high, pileus about 1″ broad, stem scarcely thicker than hog bristles.

Fallen leaves of balsam trees, *Abies balsamea.* Indian Lake. October. (Plate 4, figs. 27–29.)

A remarkably slender and delicate species. There are about a half dozen lamellæ with now and then an intermediate short one.

PANUS SALICINUS *n. sp.*

Pileus firm, thin, convex, deflexed or subpendant, hygrophanous, minutely farinaceo-tomentose, pinkish-gray; lamellæ moderately broad and close, converging to an excentric point, dark ferruginous; stem very short or obsolete, obliquely attached to the vertex of the pileus.

Plant gregarious, pileus 4″–6″ broad. Trunks of dead willows, *Salix discolor*. Center. October.

BOLETUS BICOLOR *n. sp.*

Pileus fleshy, firm, convex, dry, nearly smooth or pruinose-tomentose, dark red, tubes plane, attached, small, angular, subcompound, short, bright yellow becoming ochraceous, slightly changing to blue when wounded; stem subequal, firm, solid, dark red, sometimes yellow at the top; spores narrowly elliptical, $\frac{1}{2500}'$ long; flesh bright yellow, unchanging when wounded; taste pleasant.

Plant closely gregarious 2′ high, pileus 2′ broad, stem 4″–6″ thick. Ground in open woods. Sandlake. August. (Plate 2, figs. 5–8.)

The tubes are not more than 1″ long in our specimens Allied to *B. sulfureus*, but very different in color.

BOLETUS GRACILIS *n. sp.*

Pileus convex, dry, smooth or most minutely tomentose, ochraceous-brown; tubes plane, subfree or depressed about the stipe, small, subrotund, whitish then pale flesh-colored; stem slender, equal or slightly tapering upward, solid, marked with slender, elevated lines which anastomose and form very long narrow reticulations; spores flesh-colored, $\frac{1}{2000}'$ long.

Plant 4′–6′ high, pileus 2′ broad, stem 3″–4″ thick. Ground in woods. Garrisons and Greig. June. September.

Closely allied to *B. felleus*, but the plant is much more slender, and the character of the reticulations is quite different.

POLYPORUS PORIPES *Fr.*

Ground. New Baltimore, *Howe*. Sandlake. August. A large tufted species with the pores running far down on the stipe.

POLYPORUS FRONDOSUS *Fr.*

Buffalo. *Clinton*.

POLYPORUS GLOMERATUS *n. sp.*

Pileus of a corky texture, densely imbricated, nearly plane, uneven, minutely velvety-tomentose, dark tawny, similarly colored within and obscurely zonate, united behind in a large irregular mass; pores nearly plane, small, angular, greenish-yellow with purple tints, the mouths whitish inclining to yellow, at length dentate-lacerate; spores bright yellow, globose, $\frac{1}{5000}'$ in diameter.

Plant forming masses a foot long and 2′ or 3′ thick, the pilei 1′–1.5′ long, 2′ or more broad.

On a prostrate trunk of a maple tree, *Acer saccharinum.* Indian Lake. October.

The central mass was much eaten by the larvæ of insects.

POLYPORUS RUBIGINOSUS *Rostk.*

Trunks of deciduous trees. Indian Lake. October.

POLYPORUS MARGINATUS *Fr.*

Stumps and old trunks of trees. Indian Lake. October.

POLYPORUS FUMOSUS *Fr.*

Old stumps. Hoosick Falls, Rensselaer county and Indian Lake. September and October.

POLYPORUS BETULINUS *Fr.*

Trunks of dead birches. Common in swamps and mountainous districts. September, November.

The lower surface or hymenium is frequently rough with numerous acicular projections, making the plant look like a Hydnum when viewed horizontally.

POLYPORUS CÆSIUS *Fr.*

On dead shrubs. Indian Lake. October.

POLYPORUS ZONATUS *Fr.*

Dead branches. Greenbush. The specimens are very dark colored.

POLYPORUS VELUTINUS *Fr.*

Old stumps. Greig. September.

POLYPORUS ELONGATUS *Berk.*

Prostrate poplar trunks. Thurman. October. It resembles *P. laceratus.*

POLYPORUS VITICOLA *Fr.*

Dead grape-vines. Greenbush. October.

POLYPORUS VAILLANTII *Fr.*

On wood in cellars. Albany. November and December. Our specimens, when fresh, have a strong odor.

POLYPORUS VESICULOSUS *B. & C.*

Old logs. Johnsburgh, Warren county. October.

POLYPORUS CORTICOLA *Fr.*

Rotten wood. Center. October.

TRAMETES SEPIUM *Berk.*

Oak fence rails. Greenbush. October.

HYDNUM FERRUGINEUM *Fr.*

Ground. Sandlake. August.

HYDNUM ZONATUM *Batsch.*

Fallen branches. Albany and Trenton Falls. September.

HYDNUM PITHYOPHILUM *B. & C.*

Rotten wood. Johnsburgh. October.

KNEIFFIA SETIGERA *Fr.*

Dead branches of alders. Center. October.

KNEIFFIA CANDIDISSIMA *B. & C.*

Rotten wood. Indian Lake. October.

ODONTIA FIMBRIATA *Fr.*

Dead grape vines. Greenbush. October.

PHLEBIA RADIATA *Fr.*

Beech logs in woods. Buffalo. *Clinton.* Greig and Indian Lake. September, October.

PHLEBIA ZONATA *B. & C.*

On poplar trunks. Greenbush. October.

TREMELLA FOLIACEA *Pers.*

Stumps and old logs. Buffalo. *Clinton.* Greenbush. July.

GUEPINIA SPATHULARIA *Fr.*

Beech logs. Greig. Buffalo. *Clinton.*

STEREUM ALBOBADIUM *Schw.*

Stumps and trees. Greenbush. October.

STEREUM CURTISII *Berk.*

Oak trees and branches. Greenbush. October.

STEREUM RUGOSUM *Fr.*

Prostrate trunks of trees. Sandlake and Johnsburgh. August, October.

CORTICIUM INCARNATUM *Fr.*

Dead trunks and branches of trees. Greenbush. October.

CORTICIUM LIQUIDAMBARIS *B. & C.*

Poplar trunks and branches. Greenbush and Center. October.

CORTICIUM SALICINUM *Fr.*

Dead trunks and branches of willows, especially *Salix discolor.* Buffalo. *Clinton.* Center and Indian Lake. October.

One of the prettiest species of the genus. Large specimens sometimes have the hymenium reticulated with vein-like elevations.

CORTICIUM SCUTELLATUM *B. & C.*

Branches of trees. Fort Edward. *Howe.* Greenbush. July.

CORTICIUM RUBICOLA *B. & C.*

Stems of the blackberry. Greenbush. October.

CORTICIUM AUBERIANUM *Mont.*

Bark of dead pine trees. Greenbush. October.

CRATERELLUS LUTESCENS *Fr.*

Swamps. Sandlake and Greig. August and September.

It is sometimes so much lobed and imbricated on the margin that it has a roseate appearance.

THELEPHORA CORALLOIDES *Fr.*

Ground in open woods. Greenbush. July.

THELEPHORA TUBEROSA *Grev.*

With the preceding.

THELEPHORA CARYOPHYLLÆA *Fr.*

Damp shaded ground in a ravine. Albany Rural Cemetery. July.

THELEPHORA SEBACEA *Fr.*

Incrusting grasses, leaves and small plants. Catskill mountains. July.

CLAVARIA FLAVA *Fr.*

Ground in woods. Albany Rural Cemetery. July.

CLAVARIA CINEREA *Bull.*

With the preceding. July.

CLAVERIA KUNZEI *Fr.*

Damp soil near swamps or streams. Sandlake and Greig. August and September.

CLAVARIA APICULATA *Fr.*

Very rotten mossy hemlock logs. Sandlake and Greig. August and September.

CLAVARIA CRISPULA *Fr.*

Rotten wood of deciduous trees. Greig. September.

CLAVARIA TRICHOPUS *Pers.*

Sphagnous swamps. Sandlake. August.

Fries considers this a variety of *C. cristata*, but it seems to me to be very distinct and well marked by the hairy stem, not confluent with the hymenium.

CLAVARIA TETRAGONA *Schw.*

Ground in shaded places. Sandlake and Greig. Poughkeepsie, *Gerard.* August and September.

CLAVARIA FRAGILIS *Holmsk.*

Shaded ground in ravines. Albany Rural Cemetery. July.

CLAVARIA ARGILLACEA *Fr.*

Ground. Catskill mountains. July.

CLAVARIA MUCIDA *Pers.*

Soft moist rotten wood. Buffalo. *Clinton.* Indian Lake. October. A green confervoid stratum overspreads the wood where it grows.

CLAVARIA SPINULOSA *Pers.*

Ground under pine trees. Sandlake and West Albany. August, October.

CLAVARIA LIGULA *Fr.*

Ground in woods among fallen leaves. Helderberg mountains.

CALOCERA CORNEA *Fr.*

Rotten wood and fallen branches. North Greenbush and Greig. Buffalo. *Clinton.* July, September.

CALOCERA PALMATA *Fr.*

Old beech logs. Greig and Indian Lake. September and October.

CALOCERA VISCOSA *Fr.*

Rotten stumps in woods. Sandlake. August.

EXIDIA REPANDA *Fr.*

Dead branches of deciduous trees. Common. Spring and autumn.

NÆMATELIA NUCLEATA *Fr.*

Decaying trunks and branches of deciduous trees. Johnsburgh and Center. October.

NÆMATELIA ATRATA *n. sp.*

Flat, effused, pallid or brownish, at length black; nuclei numerous, scattered or close, rather large, often rugose and umbilicate soon black.

Dead branches of bass wood, *Tilia Americana.* Helderberg mountains and Greenbush. May.

Very distinct by reason of the black nuclei.

CYPHELLA FULVA *B. & R.*

Dead branches of alders. Common. October and November.

PHALLUS IMPUDICUS *Fr.*

Ground among leaves. Buffalo. *Clinton.* Thurman. October.

CORYNITES RAVENELII *Berk.*

Ground. Albany Rural Cemetery.

Our plant has a very strong odor and is not at all attenuated toward the base—particulars in which it does not agree with the description, but they are scarcely to be regarded of specific importance.

A species of Corynites, possibly the same as this, has been found near Utica by Judge A. S. Johnson and Hon. Horatio Seymour, but I have seen no specimens.

GEASTER MINIMUS *Schw.*

Grassy ground. Knowersville, Albany county. May.

LYCOPERDON ATROPURPUREUM *Vitt.*

Grassy ground. West Albany, October. A single specimen.

LYCOPERDON MOLLE *Pers.*

Swamps. Sandlake. August. This is thought by some to be a variety of *L. gemmatum*, but it appears to me to be quite distinct.

LYCOPERDON SUBINCARNATUM *n. sp.*

Peridium globose, sessile, bursting at the apex by a circular aperture, rough, with equal, close, subpyramidal, persistent brownish scales or granules; spores greenish-ochre, filling almost the entire cavity.

Plant 6″–10″ in diameter, generally of a pinkish-brown color, with but little cellular tissue at the base. The peridium is more thin than it is in *L. pyriforme*, but not so brittle.

Rotten wood in woods. Sandlake and Greig. August and September.

Scleroderma Bovista *Fr.*

Grassy ground. Greenbush and Albany. July.

Stemonitis fusca *Roth.*

Rotten wood. Buffalo. *Clinton.* Helderberg mountains. June. Darker colored than *S. ferruginea.*

Arcyria punicea *Pers.*

Rotten wood. Greenbush. July.

Trichia pyriformis *Hoffm.*

Rotten wood and bark. Buffalo. *Clinton.* Center. October.

Trichia chrysosperma *DC.*

Among mosses. Sandlake. August.

Trichia varia *Pers.*

Bark of an old log. Helderberg mountains. May.

Trichia serpula *Pers.*

Rotten wood, etc. Buffalo. *Clinton.* Center. October.

Didymium squamulosum *A. & S.*

Bark of dead branches. Sandlake.

Dictydium magnum *n. sp.*

Peridium globose, thin, fragile, irregularly reticulated, purplish-blue, pruinose; stem elongated, filiform, whitish or straw color; spores globose, black, $\frac{1}{2500}'$ in diameter.

On some effete Polyporus and wood impregnated with its mycelium. Center. October.

The stems are 4″–6″ long, and in the dry specimens they become twisted and entangled so that it is difficult to separate a plant from the cluster. The peridia are about $\frac{1}{16}'$ in diameter, rupture irregularly, are iridescent and look like small clusters of miniature grapes or little blue berries.

Mycrothyrium Smilacis *De Not.*

Dead stems of Smilax. Sag Harbor, L. I. and Garrisons. June and July.

Leptostroma vulgare *Fr.*

Dead stems of herbs. Buffalo. *Clinton.* Greenbush. June.

Phoma ampelinum *B. & C.*

Dead stems of grape vines. Sandlake and Greenbush. June and July.

Phoma liberatum *B. & C.*

On fallen pine leaves. Center. October.

Phoma Menispermi *n. sp.*

Perithecia small, scattered, elevated, black, shining, seated on the inner bark, bursting through the epidermis, spores minute.

Dead stems of *Menispermum Canadense.* Greenbush. November.

Little white spots remain where the perithecia are broken away. Sometimes, in a favorable light, little elevated lines may be seen extending from one perithecium to another.

Sphæronema subtile *Fr.*

Rotten wood. Buffalo. *Clinton.*

Sphæronema subulatum *Fr.*

Decaying Agarics. Helderberg mountains. June.

Sphæronema pruinosum *n. sp.*

Perithecia scattered, seated on the inner bark, erumpent through the epidermis, elongated-conical or short spiniform, blunt, black, pallid or yellowish at the base, more or less pruinose: globule hyaline; spores large, oblong, $\frac{1}{1000}'$ long.

Dead branches of *Amelanchier Canadensis.* Garrisons. June.

The branch is roughened by the projecting perithecia, which are sometimes so pruinose that it appears to be dotted with little white spots.

Sphæronema Coryli *n. sp.*

Perithecia innate in the exterior bark, very numerous, minute, slightly elevated, truncated, black, easily separating from the matrix; spores oblong or elliptical, $\frac{1}{1800}'$ in length.

Dead branches of *Corylus Americana.* West Albany. July.

The perithecia are rather fragile, and when moist are easily compressed on the slide of the microscope, so that the jointed filaments which enter into their structure are plainly discernible.

Sphæronema acerinum *n. sp.*

Perithecia innate in the bark, bursting through the epidermis, conico-hemispherical below, with a long, slender, more or less flexuous or curved point above, black or brownish black; spores elliptical, generally with one or two pellucid nuclei.

Dead trunks and branches of the red maple, *Acer rubrum.* Greenbush, Sandlake and Indian Lake. April, October.

The perithecia are numerous and somewhat seriately placed. Their bristle-like points give to the branch a hispid or strigose appearance.

Sphæropsis pulchella *B. & C.*

Dead branches of sumach, especially of *Rhus glabra.*

Sphæropsis anomala *n. sp.*

Perithecia cæspitose, black, seated on the inner bark and bursting through transverse chinks, ostiole papillate; spores oblong, $\frac{1}{1200}'$ long.

Bark of dead cherry trees. Albany. *R. Prescott.*

The aspect of this species is that of *Tympanis conspersa Fr.*, but the fructification is that of a Sphæropsis.

Sphæropsis Menispermi *n. sp.*

Perithecia numerous, prominent, black, at first covered by the epidermis, which at length bursts, revealing the apex of the perithecia; spores oblong, $\frac{1}{1800}'$ long.

Dead stems of *Menispermum Canadense.* Greenbush. November. Buffalo. *Clinton.*

The stem is roughened by the prominent perithecia, and the epidermis of the bark gives them a shining appearance.

Vermicularia Dematium *Fr.*

Dead stems of herbs. West Albany. May.

Vermicularia ovata *Schw.*

Dead stems of herbs. Greenbush. May.

Discosia Artocreas *Fr.*

Fallen oak leaves. Greenbush.

Melanconium bicolor *Nees.*

Dead branches of the white birch, *Betula populifolia* Center. June.

Discella obscura *B. & C.*

Dead branches of *Acer spicatum.* Knowersville. July.

CORYNEUM CLAVÆSPORIUM *n. sp.*

Spores long, slightly curved, club-shape, obtuse, multiseptate, seated on a hard, subglobose, black disk.

Dead branches of ash trees, *Fraxinus Americana.* Knowersville. May.

The spores easily break from the disk, which then might be taken for a *Sclerotium.* The articulations of the club sometimes contain paler subquadrate spaces within which is a globule or nucleus.

NEMASPORA AUREA *Fr.*

Dead branches of *Carpinus Americana.* Greenbush. May. The spores in our specimens form a globule rather than tendrils.

NEMASPORA RUSSELLII *B. & C.*

Dead branches of locust trees, *Robinia pseudacacia.* Albany. June.

SEPTORIA VIOLÆ *Desm.*

Leaves of *Viola cucullata.* West Albany. May.

SEPTORIA PHLYCTÆNOIDES *B. & C.*

Dead stems of *Asparagus officinalis.* Knowersville. June.

SEPTORIA HIPPOCASTANI *B. & Br.*

Leaves of *Æsculus Hippocastanum.* Albany. June.

SEPTORIA NABALI *B. & C.*

Early or radical leaves of Nabalus. Buffalo. *Clinton.* Greenbush and Sandlake. May.

SEPTORIA ERIGERONIS *n. sp.*

Spots small, orbicular, distinct, rarely confluent, arid, surrounded by a dark brown or blackish line; perithecia minute, black on the upper surface of the leaf; spores thread-shaped, simple, $\frac{1}{1000}'$ long or more.

Leaves of *Erigeron annuum.* Greenbush. July. The spots are 1‴–2‴ in diameter.

SEPTORIA LOBELIÆ *n. sp.*

Spots orbicular, frequently confluent, arid, of a pallid or pale cream color, surrounded by a broad, blackish or brownish-purple margin; perithecia minute, numerous, close, black, appearing on both sides of the leaf; spores thread-shaped, simple, $\frac{1}{1500}'-\frac{1}{1000}'$ long.

Leaves of *Lobelia spicata*. Nassau, Rensselaer county. June.

The spots are generally $1''$–$2''$ in diameter. The colored margin is usually paler as it recedes from the spot.

CYTISPORA MELASPERMA *Fr.*

Dead branches of birches. Sandlake. May.

CYTISPORA PARVA *B. & C.*

Dead branches of *Robinia pseudacacia*. Garrisons. June.

CYTISPORA CORYNEOIDES *B. & C.*

Dead grape-vines. Greenbush. July.

CYTISPORA HYALOSPERMA *Fr.*

Dead branches of *Acer rubrum*. Sandlake. May.

TORULA POPULINA *n. sp.*

Spore threads aggregated in minute tufts, situated on the under surface of the leaf, on arid, orbicular, distinct or sub-confluent brown spots, with one to three strictures, breaking up into oblong-elliptical, subacute spores.

Leaves of *Populus grandidentata*. Luzerne, Warren county. June.

The spots have a dark, well defined margin and a reddish-brown color on the upper surface of the leaf. At first sight, they suggest the idea of a *Depazea* or a *Septoria*.

UREDO HELIANTHI *Schw.*

Leaves of Helianthus. Buffalo. *Clinton.*

UREDO ASPIDIOTUS *n. sp.*

Spots yellow or greenish-yellow, oblong, acute at the ends, often slightly curved, usually distinct and limited by veinlets, sometimes confluent; sori small, rotund, a little elevated, one to three on each spot, on the upper surface of the frond; spores yellow, ovate or pyriform, $\frac{1}{800}'$ long, a little more than half as wide.

Fronds of *Phegopteris Dryopteris*. Catskill mountains. July. (Plate 1, figs. 18–20.)

At a little distance the fronds on which this fungus grows appear as if infested by a yellow scale insect, so exactly do the spots resemble the shape of some species of *Aspidiotus*. *U. Filicum* has subglobose spores and the sori occur on the under surface of the frond.

UREDO ÆCIDIOIDES *n. sp.*

Spots obliterated, sori amphigenous, bullate, small, scattered or close; spores globose, at first covered by the epidermis, then surrounded by its ruptured remains, bright yellow or orange, $\frac{1}{1200}'$ in diameter.

Leaves, petioles and stems of *Amphicarpæa monoica.* Common. June and July.

When the sori are evacuated, the rather firm epidermis walls remain, forming a little cup with a narrow mouth and resembling the cups of some species of *Æcidium.*

Trichobasis Iridicola *n. sp.*

Sori amphigenous, rotund, oval or oblong, rarely linear, a little elevated, surrounded by the ruptured remains of the epidermis; spores globose, minutely echinulate, brown, $\frac{1}{1000}'$ in diameter.

On both sides of living and half dead leaves of *Iris versicolor,* frequently occupying nearly the whole surface of the leaf. Sandlake. September. (Plate 3, figs. 17–19.)

Uredo Iridis Schw. is described as having yellow-ferruginous spores, and is placed in his section "Rubigines," whereas, our species would belong to his section "Fuscescentes et Nigredines."

Trichobasis Galii *Lev.*

Leaves of some *Galium.* New Baltimore. June. *Howe.*

Trichobasis Labiatarum *Lev.*

Leaves of *Calamintha Clinopodium.* Buffalo. *Clinton.*

Trichobasis suaveolens *Lev.*

Leaves of Canada thistle. Common. June and July.

Ustilago longissima *Tul.*

Leaves of *Poa aquatica.* West Albany. June and July.

Our specimens are not as dark colored as the European ones we have seen, and the spores are a very little larger.

Ustilago Montagnei *Tul.*

Spikes of *Rhynchospora alba.* Sandlake. August.

Lecythea Rosæ *Lev.*

Leaves of rose bushes. New Baltimore. *Howe.*

Uromyces Polygoni *Fuckel.*

Stems of *Polygonum aviculare.* New Baltimore. *Howe.* Sandlake. November.

The species is remarkable for the long thick pedicel, which is sometimes four or five times the length of the spore. A central nucleus is generally visible in the spore.

Uromyces Caricis *n. sp.*

Sori small, rotund or oval, generally scattered and distinct; spores varying from globose to elliptical or oblong pyriform, brown, $\frac{1}{1500}'$–$\frac{1}{1000}'$ long; pedicel usually very long, slender.

Under surfaces of leaves of *Carex stricta*. Center. November.

Uromyces appendiculata *Lev.*

Pea leaves. Buffalo. *Clinton.*

Uromyces solida, *B. & C.*

Leaves of Desmodium. Buffalo. *Clinton.*

Pileolaria brevipes *B. & C.*

Leaves of poison ivy, *Rhus Toxicodendron.* Common. July, September.

I have received specimens of this species from *Howe*, *Gerard*, and *Clinton.*

Aregma obtusatum *Fr.*

Leaves of *Potentilla Canadensis.* Poughkeepsie. *Gerard.* Saratoga. September and October.

Puccinia Noli-tangeris *Cd.*

Leaves of *Impatiens pallida.* Cherry Valley. Otsego county. October.

Puccinia Galiorum *Lk.*

Leaves of *Galium.* Buffalo. *Clinton.*

Puccinia Polygonorum *Lk.*

Leaves of *Polygonum amphibium.* Buffalo. *Clinton.*

Puccinia emaculata *Schw.*

Leaves of *Panicum capillare.* Greenbush. October.

Puccinia striola *Lk.*

Leaves of *Scirpus Eriophorum.* West Albany. October.

Puccinia Convolvuli *B. & C.*

Leaves of *Calystegia sepium.* Poughkeepsie. *Gerard.* Buffalo. *Clinton.* North Greenbush and Sandlake. September and October.

Puccinia Pyrolæ *Cooke.*

Under surface of leaves of *Polygala paucifolia.* Buffalo. *Clinton.* Sandlake. May.

The sori sometimes occupy the whole under surface of the leaf. Their black color contrasts beautifully with the light color of the spot.

PUCCINIA TRIPUSTULATA *n. sp.*

Spots very small, angular, distinct, yellowish; sori hypogenous, few, distinct; spores broadly ovate or sub-triangular, tripustulate, scarcely constricted, brown, $\frac{1}{700}'$ long, about $\frac{1}{1000}'$ in diameter; pedicel short or obsolete.

Under surface of leaves of the blackberry, *Rubus villosus.* Greig. September. (Plate 3, figs. 14–16.)

A remarkably distinct species. There are usually from one to five sori on each spot. There are three prominent points or angles to each spore, one at the apex, two at the base of the spore. To one of the latter points the pedicel is attached. The other is sometimes considerably removed from its neighbor, so that it appears to be almost lateral. A little pellucid pustule usually crowns these points, and sometimes two may be seen on the apical prominence.

PUCCINIA MINUTULA *n. sp.*

Spots suborbicular, scattered or confluent, yellow, with a purple or brown center; sori situated on the center of the spot, very small, crowded, black, covered by the epidermis; spores oblong, acute or acuminate, rarely obtuse, slightly constricted, $\frac{1}{600}'$–$\frac{1}{500}'$ long; pedicel generally shorter than the spore.

Under surface of leaves of *Solidago altissima.* Catskill mountains. July.

The sori under a lens look like some small Sphæria. Allied to *P. virgaureæ.*

PUCCINIA GERARDII *n. sp.*

Spots orbicular, distinct or sub-confluent, yellow, depressed above, bullate below; sori crowded, matted together, or confluent, tawny or amber-brown; spores oblong-clavate, distinctly constricted, obtuse, $\frac{1}{700}'$ long, pedicel nearly as long as the spore.

Under surface of leaves of *Aster simplex.* Poughkeepsie. *Gerard.* Greenbush. July.

The different color and matted appearance of the sori separate this species from *P. Asteris* Schw.. Sometimes the sori are quite plentiful on the superior surface of the leaf.

ÆCIDIUM BERBERIDIS *Pers.*

Leaves of barbery, *Berberis vulgaris.* Buffalo. *Clinton.* Catskill. July.

ÆCIDIUM ERIGERONATUM *Schw.*

Leaves of *Erigeron strigosum.* Center.

ÆCIDIUM TENUE *Schw.*

Leaves of *Eupatorium ageratoides.* Catskill mountains. July. Peridia sometimes beautifully circinating.

ÆCIDIUM PENSTEMONIS *Schw.*

Leaves of *Penstemon pubescens.* Buffalo. *Clinton.* June.

ÆCIDIUM THALICTRI *Grev.*

Leaves of some Ranunculaceous plant. Buffalo. *Clinton.* This species is as beautiful as it is rare. June.

ÆCIDIUM RANUNCULACEARUM *DC.*

Leaves of some Anemone or Ranunculus. Buffalo. *Clinton.* July. This is clearly distinct from *Æ. Ranunculi* Schw.

ÆCIDIUM EUPHORBIÆ-HYPERICIFOLIÆ *Schw.*

Leaves of *Euphorbia hypericifolia.* Buffalo. *Clinton.* July.

ÆCIDIUM URTICÆ *DC.*

Leaves of *Urtica dioica.* Poughkeepsie. *Gerard.*

ÆCIDIUM OSMORRHIZÆ *n. sp.*

Spots yellowish, frequently on the midveins; peridia hypogenous, clustered or seriated along the veins, slightly elevated, with the margin subentire, incurved; spores subglobose, yellow, becoming pale, $\frac{1}{1000}'$ in diameter; spermogonia central, on the same side.

Leaves of *Osmorrhiza brevistylis.* North Greenbush. June. The peridia are visible on the opposite side in the form of little tubercles as in *Æ. tenue.*

ÆCIDIUM MARIÆ-WILSONI *n. sp.*

Spots orbicular, yellow; subiculum not thickened nor excavated; peridia small, slightly elevated, subcircinating, numerous, the margin distinctly scalloped and reflexed; spores subglobose, orange becoming pale, $\frac{1}{1800}'-\frac{1}{1600}'$ in diameter.

Under surface of leaves of *Viola cucullata.* West Albany. June. Dedicated to Miss Mary L. Wilson.

This species is quite distinct from *Æ. Violæ* in the character of the subiculum, smaller spores, peridia, etc. The latter species is common on *V. pubescens.*

ÆCIDIUM MENTHÆ *DC.*

Leaves of some Labiate plant. Buffalo. *Clinton.*

ÆCIDIUM IRIDIS *Gerard in lit., n. sp.*

Spots oval or suborbicular, yellow; peridia amphigenous, short, seriately placed; spores bright orange, $\frac{1}{1200}'$–$\frac{1}{1000}'$ in diameter; spermogonia abundant, central, amphigenous.

Leaves of *Iris versicolor*. Poughkeepsie. *Gerard.* Buffalo. *Clinton.*

The peridia are equally abundant on both sides of the leaf, and are mostly arranged in lines between the veinlets of the leaf, characters by which this species may be easily known.

ÆCIDIUM ALLENII *Clinton in lit., n. sp.*

Spots large, indefinite, yellowish; peridia hypogenous, elongated, cylindrical, white, nestling among the tomentum of the leaf; spores bright orange, subglobose, $\frac{1}{1000}'$ in diameter.

Leaves of *Shepherdia Canadensis*. Buffalo. *Clinton.* June.

A fine species, dedicated to Dr. T. F. Allen. The spots are visible on the upper surface of the leaf, but are concealed by the tomentum on the lower surface.

RŒSTELIA CORNUTA *Tul.*

Leaves of *Cratægus*, *Amelanchier Canadensis* and *Pyrus Americana*. Poughkeepsie. *Gerard.* Greenbush.

STILBUM RHOIS *B. & C.*

Branches of *Rhus glabra*. Garrisons and Greenbush. June, October.

STILBUM PELLUCIDUM *Schrad.*

Rotten wood of deciduous trees. Indian Lake. October.

STILBUM GIGANTEUM *n. sp.*

Stem firm, stout, black, equal or slightly tapering upward, single or cæspitose, surmounted by a soft, viscid, whitish, subglobose head; spores minute, elliptical, about $\frac{1}{12000}'$ long.

Old logs in woods. Buffalo. *Clinton.* Catskill mountains and Greig. September and October. (Plate 3, figs. 7–9.) The stems are 3″–5″ high.

FUSARIUM ERUBESCENS *B. & C.*

Dead branches. Center. October.

TUBERCULARIA NIGRICANS *DC.*

Dead branches of apple tree, elder, etc. Center. October.

OIDIUM FRUCTIGENUM *Kze.*

On old plums. Sandlake. October.

Sepedonium chrysosperum *Fr.*

On some species of Boletus. Indian Lake. October.

Monotospora triseptata *n. sp.*

Stem erect, straight, septate, gradually tapering upward, surmounted by a single broadly elliptical triseptate black spore; the two central spore cells colored, the two outer ones smaller and colorless or diaphanous.

Rotten wood. Greenbush. June. (Plate 1, figs. 14–17.)

To the naked eye the wood occupied by this plant appears to be coated with minute black setæ.

Helvella crispa *Fr.*

Ground among fallen leaves in woods. Greig. September. Buffalo. *Clinton.*

Helvella sulcata *Afz.*

Among moss at the base of a tree. Greig. September. Only a single specimen was found.

Helvella elastica *Bull.*

Rotten wood in woods. Greig. September.

Helvella gracilis *n. sp.*

Pileus thin, somewhat irregular, slightly depressed in the center, entirely free from the stem, pale yellow above, white and rugose-reticulated beneath; stem long, firm, solid, nearly straight, wavy-uneven, slightly tapering at the top, whitish or dull cream color, with white mycelium at the base; spores elliptical.

Ground in open woods. Catskill mountains. July.

Allied to *H. Infula*, but a more graceful species, with simple spores. In *H. Infula* the spores have each two nuclei.

Leotia circinans *Pers.*

Ground in woods. North Elba. August.

Geoglossum luteum *n. sp.*

Club distinct from the stem, smooth, compressed, generally with a groove on one side, luteous, often becoming brown at the apex; stem equal or slightly enlarged above, stuffed, luteous, minutely scaly; spores oblong, slightly curved, in a double row, $\frac{1}{1000}'$–$\frac{1}{800}'$ long.

Among moss, on and about rotten stumps in swamps or damp woods. Sandlake. August. (Plate 3, figs. 20–24.)

Peziza fusca *Pers.*

Rotten wood and dead branches in damp places. Helderberg mountains and Greenbush. June.

Peziza rubricosa *Fr.*

Ground. Highlands. June.

Peziza vinosa *A. & S.*

Rotten wood. Greenbush. June.

Peziza mollisioides *Schw.*

Base of *Vaccinium corymbosum.* Greenbush. October.

Peziza Erinaceus *Schw.*

Rotten maple trunk. Indian Lake. October.

Peziza comata *Schw.*

Fallen leaves in a swamp. Sandlake. August.

Peziza hemisphærica *Wigg.*

Damp ground and rotten wood. Catskill mountains. July.

Peziza æruginosa *Fr.*

Rotten wood of deciduous trees. Buffalo. *Clinton.* Sandlake. August.

Peziza echinosperma *n. sp.*

Cups slightly concave, sometimes irregular, orange, becoming paler, whitish externally, smooth, 1″–2″ in diameter, spores globose, echinulate; paraphyses slender, orange.

Damp ground in pastures. West Albany. June. (Plate 3, figs. 10–13.)

Peziza rubra *n. sp.*

Cup subglobose, at length hemispherical; mouth narrow, often irregular; spores broadly elliptical, without any nucleus; plant smooth, red throughout, 2″–3″ in diameter.

Burnt ground. Top of the Highlands. June. (Plate 2, figs. 19–21.)

Peziza cariosa *n. sp.*

Closely gregarious; cup sessile, thin, flattened, slightly concave, smooth, black, dark brown with a reddish tinge when moist; margin distinct, flexuous or angular in large individuals; spores, simple, oblong.

Plant scarcely half a line broad. Rotten wood. Catskill mountains. July.

PEZIZA TILIÆ *n. sp.*

Gregarious, minute, cup sessile, concave, externally densely white villous, the disk pale yellow or cream colored, often concealed by the inflexed hairs.

Dead branches of *Tilia Americana*. Knowersville. July. Very different from *P. tiliacea* Fr. The largest cups are scarcely half a line broad.

PEZIZA PERSOONII *Moug.*

Stems of *Equisetum hyemale*. Center. November and May.

Our plant is generally sessile and often crowded or tufted in its mode of growth. When moist it is much expanded and flattened on the disk. Further observation may show it to be a distinct species.

NODULARIA *nov. gen.*

Receptacle fleshy, margined; disk dusted with the spores; asci large, fixed; paraphyses present, nodose or sub-moniliform.

This genus is intermediate between *Peziza* and *Patellaria*. From the former it is separated by the dusted hymenium and nodulose paraphyses, from the latter by the presence of paraphyses. The name is derived from the Latin *nodulus*, and is given in allusion to the little knots of the paraphyses.

NODULARIA BALSAMICOLA *n. sp.*

Cups flattened, sessile, scattered or somewhat confluent, often irregular, with a distinct, more or less flexuous, incurved margin, externally pinkish white, slightly silky-villous; disk luteous, inclining to reddish or orange, whitish-dusted under a lens; asci large, clavate, obtuse, somewhat irregular or flexuous; paraphyses subflexuous, with two or three moniliform nodes at the top; spores globose, echinulate.

Dead branches of the balsam fir, *Abies balsamea*. Indian Lake. October. (Plate 4, figs. 23–26.)

The cups are 1″–2″ in diameter and are attached by a little point which penetrates the bark.

DERMATEA FURFURACEA *Fr.*

Branches of alders. Center. October and November.

PATELLARIA ATRATA *Fr.*

Rotten wood. Buffalo. *Clinton.*

Tympanis alnea *Pers.*
Dead branches of alders. Buffalo. *Clinton.* Sandlake. June.

[illegible] Cerasi *B. & C.*
Knots of cherry trees. Buffalo. *Clinton.* Sandlake. June.

Cenangium Cerasi *Fr.*
Dead trunks and branches of cherry trees, especially *Prunus Pennsylvanica.* Sandlake and Center. June, November.

Cenangium [illegible] *Schw.*
Dead oak branches. Greenbush.

Cenangium Prunastri *Fr.*
Dead branches of plum and cherry trees. Buffalo. *Clinton.* Sandlake. June.

Hysterium pulicare *Fr.*
Decorticated wood. Buffalo. *Miss Wilson.* Dead grape vines. Greenbush. July.

Hysterium Smilacis *Schw.*
Dead stems of Smilax. Garrisons. June.

Hysterium Azaleae *Schw.*
Dead stems and branches of *Azalea nudiflora.* Sandlake and Center. June.

Hysterium [illegible] var. Aceris *Desm.*
Dead branches of *Acer spicatum.* Helderberg mountains. May.

Xylaria corniformis *Fr.*
Mossy maple log in woods. Greig. September.

Xylaria digitata *Fr.*
Conservatories. Buffalo. *Clinton.*

Rhizomorpha subcorticalis *Pers.*
Under bark of dead trees, etc. Buffalo. *Clinton.* Greig and Helderberg mountains.

Hypocrea floccosa *Fr.*
Under surface of the pileus of *Lactarius torminosus.* Greig. September.

Hypoxylon concentricum *Bolt.*
Rotten wood and dead branches. Common.

HYPOXYLON HOWEIANUM *n. sp.*

Globose sessile, covered with a bright red crust, which is thickly punctate with minute black papillate ostiola, at length dull yellow or black, 3″–6″ in diameter; perithecia peripheric, crowded, ovate, black, shining; stroma dense, blackish-bronze, shining, not at all or only very obscurely zonate, radiate-fibrous.

Fallen branches of some deciduous tree. Center. November.

Allied to *H. fragiforme* in its red crust and ovate perithecia, but it differs in its larger size, punctate, not tuberculose, surface, smaller spores, etc.

HYPOXYLON PERFORATUM *Schw.*

Dead branches of birch trees. Catskill mountains. July.

HYPOXYLON ARGILLACEUM *Fr.*

Trunks of beech trees. Sandlake. June. Buffalo. *Clinton.*

HYPOXYLON BEAUMONTII *B. & C.*

Denuded wood of acerose trees. Helderberg mountains. May.

HYPOXYLON MORSEII *B. & C.*

Dead branches of alders. Sandlake and Center. Spring and autumn.

HYPOXYLON ANTHRACODES *Fr.*

On a prostrate trunk of *Tilia Americana.* Trenton Falls. September.

NECTRIA PEZIZA *Fr.*

Old stumps and rotten wood. Greig and Indian Lake. September and October.

NECTRIA INAURATA *B. & Br.*

Stem of *Celastrus scandens?* Buffalo. *Clinton.*

VALSA PULCHELLA *Fr.*

Dead trunks of cherry trees. Sandlake. June.

A pretty species, but nearly concealed by the epidermis of the bark.

VALSA SALICINA *Fr.*

Dead branches of willows. Buffalo. *Clinton.* West Albany. May.

VALSA LEUCOSTOMA *Fr.*

Dead branches of apple trees. Buffalo. *Clinton.* Sandlake. October.

VALSA PINI *Fr.*

Dead branches of pine trees. Sandlake. June.

SPHÆRIA ACULEANS *Schw.*

Dead branches of sumach. Sandlake. June.

SPHÆRIA TILIÆ *Fr.*

Dead branches of *Tilia Americana.* Helderberg mountains. May.

SPHÆRIA OÖTHECA *B. & C.*

Denuded wood. Buffalo. *Clinton.*

SPHÆRIA GYROSA *Schw.*

Buffalo. *Clinton.*

SPHÆRIA COPTIS *Schw.*

Leaves of *Coptis trifolia.* Sandlake. June.

SPHÆRIA SARRACENIÆ *Schw.*

Leaves of *Sarracenia purpurea.* Sandlake. August.

SPHÆRIA SOLIDAGINIS *Schw.*

Leaves of various species of Solidago. Center. October.

SPHÆRIA LONGISSIMA *Pers.*

Dead stems of pigweed, *Chenopodium album.* Buffalo. *Clinton.* Albany. June.

SPHÆRIA TAXICOLA *n. sp.*

Perithecia minute, close, black, shining, slightly elevated, at first covered by the epidermis, then erumpent; spores oblong, in a single series, triseptate.

Occupying the whole upper surface of dead leaves of *Taxus Canadensis.* Sandlake. May.

DOTHIDEA RIBESIA *Pers.*

Dead stems of currant. Buffalo. *Clinton.* Bethlehem and Sandlake. May.

DOTHIDEA SAMBUCI *Fr.*

Dead stems of elder, *Sambucus Canadensis.* Buffalo. *Clinton.* Center. October.

DOTHIDEA CRYSTALLOPHORA *B. & C.*

Dead stems of the Osage orange. Buffalo. *Clinton.* Albany and Riverhead. May and July.

Dothidea flabella *B. & C.*

Upper surface of fronds of *Pteris aquilina*. Center. October.

Dothidea Pteridis *Pers.*

Under surface of fronds of *Pteris aquilina*. Center and Catskill mountains. June, October.

Dothidea Anemones *Fr.*

Leaves of *Anemone cylindrica*. Center. October.

Podosphæria Cerasi *Lev.*

Leaves of cherry trees. Sandlake. August.

Erineum roseum *Schult.*

Leaves of birches. Buffalo. *Clinton*. Helderberg mountains and Nassau. June.

Erineum quercinum *Kze.*

Oak leaves. Buffalo. *Clinton*. New Baltimore. *Howe*.

NEW STATIONS OF RARE PLANTS, REMARKABLE VARIETIES AND OBSERVATIONS.

Hepatica acutiloba *DC.*

I find the young leaves of this species much more fully developed at flowering time, than those of *H. triloba*. They are also subject to the attacks of a fungus, *Polycystis Ranunculacearum*, but I have never found those of *H. triloba* thus affected, even when growing in the same locality.

Dianthus Armeria *L.*

Roadsides. Nassau.

Hibiscus Trionum *L.*[*]

Newark, Wayne county. *E. L. Hankenson*.

Claytonia Virginica *L.*

Specimens from Newark, sent by Mr. Hankenson, have alternate leaves.

Nabalus racemosus *Hook.*

Scarsdale, Westchester county. Extremely bitter. *J. S. Merriam*.

Lobelia cardinalis *L.*

Mr. Merriam finds the white-flowered form on Long Island. No specimens sent.

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[*] This plant was erroneously mentioned on page 56.

Primula Mistassinica *Michx.*

Portage. *Clinton.*

Fragaria vesca *L.*

The white-fruited form of this species is abundant in Skaneateles. *S. N. Cowles.* It also occurs in Nassau, Rensselaer county, and in Bethlehem, Albany county. By cultivation, the appearance of the plant is considerably changed. The flowering stems become elongated and dichotomously branched above, the primary division is subtended by a well developed leaf and the fruit is produced throughout the season. It would make a fine addition to the ordinary varieties cultivated by gardeners.

Juncus alpinus v. insignis *Fr.*

Sodus Point, Lake Ontario. *Hankenson.*

Danthonia compressa *Aust.*

Mr. Cowles sends specimens exactly intermediate between this species and *D. spicata*, whence it is probable that the former is a variety of the latter dependent on locality.

Polypodium vulgare v. Cambricum *L.*

"Indian Brook," near Cold Spring. *Miss Sarah P. Monk.* A sterile but most interesting variety.

Aspidium aculeatum v. Braunii *Koch.*

Stony Clove, Catskill mountains. Discovered there by *J. H. Redfield.* This locality is evidently very favorable to the growth of ferns. In July last, the following nineteen species were observed while passing along the road, about the distance of half a mile, and in no case going more than four rods from it.

Polypodium vulgare *L.*
Adiantum pedatum *L.*
Pteris aquilina *L.*
Asplenium thelypteroides *Mx.*
A. Filix-fœmina *Bernh.*
Phegopteris polypodioides *Fee.*
P. Dryopteris *Fee.*
Cystopteris bulbifera *Bernh.*
C. fragilis *Bernh.*
Aspidium Thelypteris *Swartz.*
Aspidium spinulosum *Swartz.*
A. marginale *Swartz.*
A. acrostichoides *Swartz.*
A. aculeatum *Swartz.*
Struthiopteris Germanica *Willd.*
Onoclea sensibilis *L.*
Woodsia Ilvensis *R. Br.*
Dicksonia punctilobula *Kze.*
Botrychium Virginicum *Swartz.*

The whole number of species now known to belong to the State is forty-four, excluding the doubtful inhabitant *Lygodium palmatum.* It will thus be seen that nearly half our species occur in the "Stony Clove."

Botrychium lanceolatum *Angst.*

This rare fern occurs on an island in Lake Mohegan. *Leggett.*

SPHAGNUM WULFIANUM *Girgen.*

Fertile specimens were found in August.

DICRANUM RUFESCENS *Turn.*

This species occurs as far north as Johnsburgh, Warren county.

HOMALIA GRACILIS *James.*

Mount Seward. *V. Colvin.*

GRIMMIA OLNEYI *Sulliv.*

Top of the Highlands.

CETRARIA ISLANDICA V. DELISIÆI *Schær.*

Top of Mount Marcy. It approaches *C. aculeata* in appearance.

PHYSCIA CILIARIS V. ANGUSTATA *Tuck.*

Goat Island. *Miss Wilson.*

BIATORA RUBELLA V. SPADICEA *Tuck.*

Buffalo. *Miss Wilson.*

BIATORA RUBELLA V. SCHWEINITZII *Tuck.*

Balsam firs. Buffalo. *Miss Wilson.* Indian Lake.

AGARICUS MUSCARIUS *Fr.*

A white variety, with the pileus thickly studded with sharp warts, occurs in Albany Rural Cemetery. July.

AGARICUS GRANULOSUS *Batsch.*

A large firm variety, with a well developed, persistent annulus and attached lamellæ, grows on old logs in woods. Greig. September.

AGARICUS MELLEUS *Vahl.*

Very abundant in the woods of Greig, growing in large tufts and eaten by some animal, probably deer.

AGARICUS CAMPANELLA *Batsch.*

Two varieties are found in the woods about Moose River Settlement. One has a yellow pileus, the other is papillate, scarcely umbilicate, and has the stem slightly sprinkled with yellowish dust.

COPRINUS ATRAMENTARIUS *Bull.*

A variety with both pileus and stem somewhat scaly, and the former quite viscid was found in an alley in Albany. It occurs also in cellars.

LENTINUS LECOMTEI *Fr.*

I have never seen this plant with the edge of the lamellæ serrated or eroded, whence it would seem to belong rather to the genus *Panus*. The trama also is clearly present in it.

BOLETUS EDULIS *Bull.*

A singular form was found in Greenbush with the pileus deeply lacunose, the tubes not rounded at the stem, but forcibly torn away from it by the expansion of the pileus and the stem of a dull lilac color with distinct reticulations. Is it specifically distinct?

RŒSTELIA LACERATA *Sow.*

Fine specimens were found on the leaves, fruit and young twigs of *Amelanchier Canadensis.* June.

AREGMA SPECIOSUM *Fr.*

Dead stems of wild rose. Greenbush.

AREGMA MUCRONATUM *Fr.*

Leaves of *Rubus odoratus.* Trenton Falls. September.

CYSTOPUS CANDIDUS *Lev.*

This species is found on the leaves of *Capsella Bursa-pastoris*, *Sisymbrium officinalis*, *Lepidium Virginicum*, *Dentaria diphylla*, *Portulacca oleracea*, and *Amarantus retroflexus.*

PODOSPORIUM RIGIDUM *Schw.*

Dead stems of *Ampelopsis quinquefolia.* Schoharie. June.

PEZIZA AURANTIA *Fr.*

Abounds on black muck soil in woods at Moose River. September.

HYPOCREA RICHARDSONII *B. & M.*

Common on dead branches of poplar trees, but always sterile with us.

HYPOXYLON MULTIFORME *Fr.*

This very rarely occurs on bark.

(5)

Genus—CLAVARIA *L.*

Plant fleshy, erect, homogeneous, simple or branched; hymenium dry, occupying nearly or quite the whole surface.

The name of the genus is derived from the Latin *clava*, a club. Some of the species are club-shaped, others are branched above in such a manner as to resemble a miniature tree or shrub. The following is a synopsis of the species at present known to occur in the State.

a. Stems branched.

1. Spores white	2
2. Plant yellow (luteous, ochraceous, etc.)	3
3. Stem stout, much and irregularly branched	4
4. Apices of the branches red	Botrytis
4. Apices of the branches yellow	flava
3. Stem slender, dichotomously branched	tetragona
2. Plant white or cinereous (no shade of yellow)	5
5. Stem smooth, color cinereous	6
6. Apices of the branches obtuse (concolorous)	cinerea
6. Apices crested, acute (at length brown)	cristata
5. Stem hairy, apices of the branches acute	trichopus
5. Stem smooth, color white	Kunzei
1. Spores ochraceous (plant some shade of yellow or ochre)	7
7. Plant terrestrial (growing on the ground or among leaves)	8
8. Apices of the branches obtuse, concolorous	aurea
8. Apices acute or acicular, white	spinulosa
7. Plant epiphytal (growing on rotten wood, logs, etc.)	9
9. Axils concolorous (i.e., ochraceous like the rest of the plant)	10
10. On wood of acerose trees, branches straight	apiculata
10. On wood of frondose trees, branches flexuous	crispula
9. Axils becoming cinnamon colored, branches straight	stricta

b. Stems simple (rarely once divided, or with one or two branches.)

11. Growing in tufts or clusters	12
12. Plant yellow	13
13. Club hollow, mostly regular	fusiformis
13. Club stuffed, irregular or compressed	inæqualis
12. Plant white or whitish	14
14. Club and stem distinct, color dingy	argillacea
14. Club and stem confluent, color pure	fragilis

11. Growing singly or scattered	15
15. Plant terrestrial	16
16. Club fleshy, obtuse	17
17. Naked at the base, 6″–12″ thick	PISTILLARIS
17. White mycelium at the base, 2″–4″ thick,	LIGULA
16. Club filiform, acute	JUNCEA
15. Plant epiphytal	MUCIDA

All the white-spored branched species given in the preceding table are terrestrial. *C. trichopus* I have found only among sphagnum. *C. cristata* rarely occurs with branches obtuse, and not crested. *C. spinulosa* rarely may be found without white tips to the branches, but in every instance of such exceptional forms coming under my observation, they have been associated with a great abundance of the normal form. *C. inæqualis* grows especially in swamps and sometimes singly. It is quite fragile. *C. mucida* is remarkable for the green confervoid stratum that covers the moist rotten wood on which it grows.

Genus—ÆCIDIUM *Pers.*

Peridia tubular or cup-shaped, at length open at the top with the margin lobed or lacerated; spores subglobose, colored.

The peridia normally occupy the lower surface of the leaves of plants, sometimes scattered over the whole of that surface, but more often collected in little orbicular clusters. They open at the top, revealing the globose or ovate, yellow or orange-colored spores within, and are not inaptly termed "*Cluster cups.*" The margin of the cup or peridium is generally fringed or scalloped with little rounded, reflexed lobes. The subiculum or spot on which the cups are seated is usually more or less discolored, yellow and red being the prevailing hues. The spermogonia, minute pustules which occur with the cups and are thought to be the male plant, are not always readily detected. They usually occupy the center of the spot on one or both sides of the leaf. More than thirty species of Æcidium have been found in the State, of which the following is a synopsis.

a. Peridia scattered over the whole under-surface of the leaf, or over indefinite portions of it.

1. Peridia short, naked	2
2. Mouth with a few (3–5) distinct lobes	QUADRIFIDUM
2. Mouth entire, indistinctly or many lobed	3
3. Leaf green above, scarcely discolored	4
4. Spermogonia numerous, distinct	5
5. Mouth wide, lobed; leaf rugulose above	RANUNCULI
5. Mouth at first narrow, with an incurved, subentire margin; leaf not rugulose	AROIDATUM
4. Spermogonia few, indistinct or none	6

6. Mouth of the numerous equal peridia distinctly lobed	Epilobii
6. Mouth of the few unequal peridia not distinctly lobed	Euphorbiæ-hypericifoliæ
3. Leaf plainly discolored	7
7. Leaf yellowish, not thickened; peridia large	Claytoniatum
7. Leaf brownish, generally thickened; peridia not large	Houstoniatum
1. Peridia elongated, nestling in the tomentum of the leaf	8
8. Peridia few, crowded or scattered	Gnaphaliatum
8. Peridia numerous, not crowded	Allenii

b. Peridia in definite spots or clusters.

9. Elongated	10
10. Seated on a thickened subiculum	11
11. Spots brown or chestnut-colored	Fraxini
11. Spots red	Berberidis
10. Subiculum not thickened	12
12. Peridia extending to the margin of the spot	13
13. Many, in dense roundish clusters	Thalictri
13. Few, loosely placed on orbicular spots	macrosporum
12. Peridia central on a yellow spot with sterile margin	hydnoideum
9. Short or sub-immersed	14
14. On a thickened subiculum	15
15. Spots distinct, yellow	16
16. Small on the leaves, larger and most often on the petioles, which are thickened and distorted	Sambuci
16. Most often on the leaves, and as large as on the slightly thickened petioles	Violæ
15. Spots more or less red or purple, not clear yellow	17
17. Pale red, stems or petioles sometimes thickened	Clematitis
17. Chestnut-colored or reddish-brown	18
18. Peridia extending to the margin	Myricatum
18. Peridia central	Limonii
17. Yellowish stained with red or purple	pustulatum
15. Spots obliterated	19
19. Petioles often attacked and much distorted,	Urticæ
19. Petioles not distorted	20
20. Peridia wide-mouthed, crowded	Ranunculacearum
20. Peridia narrow-mouthed, spores elliptical	menthæ.
14. Subiculum not thickened	21
21. Spots yellow, with no tinge of red or purple	22

22. Peridia mostly in series; on both sides of the leaf	IRIDIS
22. Peridia not in series; on the under side of the leaf	23
23. Spots large and generally confluent	24
24. Peridia crowded	PODOPHYLLI
24. Peridia not crowded, irregular placed,	ERIGERONATUM
23. Spots small or medium, generally distinct	25
25. Peridia central	26
26. Crowded, leaf not pustulate on the opposite side	HELIANTHI
26. Loosely placed, leaf distinctly pustulate on the opposite side	TENUE
25. Peridia extending to the margin	27
27. Peridia distinctly lobed on the margin,	MARIÆ-WILSONI
27. Peridia indistinctly lobed, mostly seriated along the mid-rib	OSMORRHIZÆ
27. Peridia indistinctly lobed, not seriated,	OROBI
21. Spots more or less stained with purple or red	28
28. Spots large, pustulate, the center purple or brown	IMPATIENTIS
28. Spots medium or small, scarcely pustulate	29
29. Centrally red or purplish	30
30. Mostly on the margin of the leaf or of its lobes,	GERANII
30. On any part of the leaf	31
31. Peridia crowded, extending to the margin	GROSSULARIÆ
31. Peridia central, few, mostly less than twenty	COMPOSITARUM
31. Peridia central, many, mostly more than twenty	PENSTEMONIS
29. With a red dash extending from the spot to the margin of the leaf; peridia numerous, crowded	ŒNOTHERÆ

Some of the foregoing species are variable and will not in all cases rigidly agree with the characters here given, but a few explanations and a list of the plants on which the species are found, will remove nearly or quite all difficulties in tracing them.

Æcidium Berberidis sometimes has short peridia. I have seen but a single dried specimen of *Æ. Clematitis* which is on a thickened petiole or stem. The color of the spot is taken from the description. I have seen but few poor specimens of *Æ. Orobi*, and am not quite sure that they are rightly referred. *Æ. Impatientis* sometimes has the spots entirely yellow, and the same is true of *Æ. Geranii* and *Æ. Compositarum*. *Æ. Geranii* also rarely has a purplish or yellow dash extending to the margin of the leaf.

Æcidium	quadrifidum *DC.*	grows on	Anemone nemorosa.
Æ.	Ranunculi *Schw.*	“	Ranunculus abortivus.
Æ.	Aroidatum *Schw.*	“	Arisæma triphyllum.
	var. *Caladii Schw.*	“	Peltandra Virginica.
Æ.	Epilobii *DC.*	“	Œnothera biennis.
Æ.	Euphorb.-hypericifoliæ	“	Euphorbia hypericifolia.
Æ.	Claytoniatum *Schw*	“	Claytonia Caroliniana.
Æ.	Houstoniatum *Schw.*	“	Houstonia purpurea.
Æ.	Gnaphaliatum *Schw.*	“	Gnaphalium decurrens, etc.
Æ.	Allenii *Clinton,*	“	Shepherdia Canadensis.
Æ.	Fraxini *Schw.*	“	Fraxinus Americana.
Æ.	Berberidis *Pers.*	“	Berberis vulgaris.
Æ.	Thalictri *Grev.*	“	Ranunculaceæ.
Æ.	macrosporum *Pk.*	“	Smilax rotundifolia.
Æ.	hydnoideum *B. & C.*	“	Dirca palustris.
Æ.	Sambuci *Schw.*	“	Sambucus Canadensis.
Æ.	Violæ *Schum.*	“	Viola pubescens.
Æ.	Clematitis *Schw.*	“	Clematis Virginiana.
Æ.	Myricatum *Schw.*	“	Myrica cerifera.
Æ.	Limonii *Pk.*	“	Statice Limonium.
Æ.	pustulatum *Curt.*	“	Comandra umbellata.
Æ.	Urticæ *DC.*	“	Urtica dioica.
Æ.	Ranunculacearum *DC.*	“	Ranunculaceæ.
Æ.	Menthæ *DC.*	“	Labiatæ.
Æ.	Iridis *Gerard.*	“	Iris versicolor.
Æ.	Podophylli *Schw.*	“	Podophyllum peltatum.
Æ.	Erigeronatum *Schw.*	“	Erigeron strigosum.
Æ.	Helianthi *Schw.*	“	Helianthus.
Æ.	tenue *Schw.*	“	Eupatorium ageratoides.
Æ.	Mariæ–Wilsoni *Pk.*	“	Viola cucullata.
Æ.	Osmorrhizæ *Pk.*	“	Osmorrhiza brevistylis.
Æ.	Orobi *DC.*	“	Trifolium repens.
Æ.	Impatientis *Schw.*	“	Impatiens fulva.
Æ.	Geranii *DC.*	“	Geranium maculatum.
Æ.	Grossulariæ *DC.*	“	Ribes.
Æ.	Compositarum *Mart.*	“	Compositæ.
Æ.	Penstemonis *Schw.*	“	Penstemon pubescens.
Æ.	Œnotheræ *Pk.*	“	Œnothera biennis.

In the paper marked (4), when no name is added to the station or stations, the plant has been found therein by the writer. Dates signify the time of collecting the specimens, and therefore indicate to some extent the time of occurrence of the plant.

A continuation of the coöperation of the Botanists of the State, in the investigation of our Flora, is earnestly solicited.

Respectfully submitted.

CHAS. H. PECK.

Albany, *January* 11*th*, 1871.

ENTOMOLOGICAL CONTRIBUTIONS—NO. II.

I. ON THE LARVA AND IMAGO OF SESIA DIFFINIS, *Harris.*

By J. A. LINTNER.

The larva of the above Sphinx, nearly mature, was taken in the vicinity of Albany, July 4th, feeding on *Diervilla trifida* (bush honeysuckle). The following description represents it at maturity:

The head is oval, with small whitish points. The body tapers moderately anteriorly, and on the last three segments; the vascular line is distinct, and of a brownish shade; the dorsal region is greyish-pink; the lateral region yellow-brown, deepening into reddish-brown below the stigmata; the ventral region is brownish-red; midway between the vascular line and the stigmata is a pale yellow line, proceeding from the posterior portion of the collar, and terminating in the horn. The granulations of the collar anteriorly are yellow; those of the body are white and double-rowed upon the first annulet * of each segment, arranged rectilinearly on the last annulet, and irregularly on the intervening ones. The stigmata are oval, black-bordered, and with a white dot at each end. The legs and prolegs are unicolored with the ventral region. The caudal horn is reddish, straight, acutely granulated, and measures two-tenths of an inch in length.

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* In the Sphingidæ, and in some other families of the Lepidoptera, the segments of the larvæ are divided by impressed encircling lines into several (usually eight) subequal parts, which, by Clemens and others, have been denominated *wrinkles.* In consideration of their constant character and marked features, it would seem proper that they should be known by a name implying less of irregularity and chance, and, regarding them as subdivisions of the primary "rings" of the larva, I have, accordingly, in these notices, designated them as *annulets.*

In the Sphinges, the segments four to ten inclusive, or all the stigma-bearing segments, except the two terminal, are divided into eight of these annulets (on segment four the two anterior are not readily detected). The first three annulets encircle the body, forming complete rings; the impressed lines which define the remaining five become obsolete over the prolegs. The position of the stigma is uniformly between the third and fourth annulets, somewhat encroaching on the latter. In some of the species, the first annulet is subdivided laterally.

These annulets are a prominent feature in the ornamentation of the larva of *Ceratomia quadricornis* Harr., where each one is crowned with an elongated papilla, forming, in combination, the conspicuous dorsal row of papillæ or fleshy serrations which imparts so marked a character to that peculiar larva.

The larva measures one inch and six-tenths in repose. When observed from above in this condition, its head is not visible, being bent downward in such a position that its plane is almost parallel to the surface on which the larva rests.

The above larva fed for a day after its capture, when it fastened a leaf, by a thin irregular web of brown silk, to the side of the glass beneath which it was confined. Within this slight shelter, it transformed to a pupa on the day following, the 6th.

The imago (a female) emerged on the morning of the 19th of July, after a pupation of thirteen days. Before the wings had expanded, their entire surface was covered with scales. In fifteen minutes from the time of its escape from the pupa-case, the wings had attained their full size. They remained folded together over the back, showing their under-surface for a half-hour following, when they were brought down to their normal position. They were now seen to be overspread with light brownish scales having a golden reflection, but so thinly distributed that the usual transparent portion of the wing was plainly separable from the densely scaled marginal region.

Desirous of securing so novel a specimen in a perfect condition, I intended to leave it undisturbed for a few hours, until the danger of bleeding from too early pinning had passed. Meanwhile, the strong rays of the sun had encroached upon that portion of the breeding-cage where the moth was resting, and driven it to a shaded corner. In this change of position, its wings, after the habit of many of the moths at this stage, were probably put in vibration, but not used in flight about the cage, for the cilia and thoracic scales were intact; yet this moderate use of them sufficed to destroy the peculiar beauty of the specimen, by divesting it of the greater portion of the very slightly attached scales. Upon the anterior wings, only those remained which bordered the nervures and posterior marginal band. Over the posterior wings, they were still uniformly distributed, but not so closely as at first.

It will be interesting to those who have the opportunity of making the observation, to ascertain which of our Sesias emerge from their pupal state, with scales covering that portion of their wings which we are accustomed to see as transparent. *Sesia Buffaloensis* Gr. & Rob., is known to do so in both sexes, and to retain them, to a small extent, when taken in a comparatively fresh condition in the field. While the adherence of the scales in this species is stronger than in *S. diffinis*, in no field specimen of which have I ever seen them remaining even along the nervures, yet their attachment is very slight, for with the utmost care, I have never succeeded in preparing *S. Buffaloensis* ex larva, without an attendant loss of many of its scales. Field collections of *Sesia gracilis* Gr. & Rob., regarded as "perfect," show none of these scales.

S. diffinis appears to be eminently a day-flier, for I have never taken it at twilight when others of its congenors and of Thyreus have been abundant. In 1869, I captured it twice on lilac blossoms, but it was usually met with hovering over flowers in open spots, particularly those of *Lupinus perennis.* It was observed at Center, N. Y., during the year 1869, on May 25th, 27th, June 1st, 3d, 7th, 9th and 15th. The earliest date of its capture which I have recorded, is May 12th. Its usual time of apparition, in this State, would seem to be the last week of May. It has, as appears from the above larval observations, a spring and a summer brood; the latter, in seasons not unusually forward, may be expected about the last of July, extending into August.

The female appears to be quite rare. Among a considerable number of captured individuals of the species in my collection, not a single female occurs.

II. TRANSFORMATIONS OF SESIA BUFFALOENSIS, *GR. AND ROB.*

An egg of the above comparatively rare Sphinx was found on the snowball (*Viburnum opulus*), at Schoharie, N. Y., August —, 1868; it was nearly round, smooth, and of a pale green color. The time of its hatching was not noted.

The *young larva* was of a uniform whitish-green, with a straight, dark brown caudal horn.

Its *first molt* occurred August 24th: Length, 15-100ths of an inch; color, uniform pale green, of the shade of the midvein of the leaf. Body, under a simple lens, showing a number of delicate hairs. Caudal horn, brown, smooth and straight. When in position for the next change, its length was 32-100ths of an inch, and its diameter 4-100ths of an inch.

Second molt—August 30th: Length, 35-100ths of an inch. Head uniform pale green, with short, fine whitish hairs. Body, slightly hairy, pale green, with a lateral stripe of yellow green; segments with a yellow-green dot in front on each side of the vascular line, and a few smaller ones on the posterior half. Caudal horn straight, nearly cylindrical, light red, striped anteriorly near the base and tipped with brown, and spotted with brown intermediately; borne at an angle of about forty degrees.

At this stage the larva died from injuries received from some larger ones with which it was confined in a small box while their supply of food had become exhausted. The collection of three other larvæ of the species from the same bush, after their first molting, afforded the opportunity of continuing its history.

Third molt (six days after their preceding one), on August 24th: Length, one-half inch. Head granulated. Collar bordered anteriorly with about twelve small tubercles. Body with features as before recorded, and in addition, minutely papillose. Caudal horn light red, regularly tapering from base to tip, covered with spinules which anteriorly and posteriorly have black bases. Stigmata deep orange, with a yellow-green dot at each end; those of the proleg-bearing segments bordered before with a deep orange line. Legs at the base marked with black; prolegs on the outer side, and body beneath on the last two segments, pale red.

Fourth molt—six days later, on August 30th: Length, 65-100ths of an inch; breadth, 13-100ths. Head green, of the shade of the lower side of the leaf, its surface appearing shagreened under a lens, marked with indistinct lateral stripes, and dotted with whitish granulations, which diminish in size toward the center; mandibles yellow, black tipped; eyes on a fuscous crescent. Collar with whitish granulations, except on the anterior margin where they are orange. Body greenish-white dorsally, with a vascular line of rose-pink interrupted at the incisures; a lateral stripe of yellow-green papillæ of one to each annulet, edged above with darker green, and below with green shading deeper to the prolegs; lateral papillæ greenish-yellow; ventrally, from the fourth segment to the posterior extremity, concolorous with the vascular stripe. Caudal horn curved, rose-colored, tipped with ferruginous, with fuscous spinules anteriorly and posteriorly. Stigmata crimson, white-dotted at the extremities, and surrounded with rose. Legs and prolegs ferruginous basally, next fuscous, and rufous terminally.

As the larva approaches maturity, it becomes more white dorsally, the red of the vascular stripe changes to white, and the red surrounding the stigmata disappears. With the distention of the skin, the papillæ change to whitish ocellations.

On September 6th, the above larvæ commenced constructing their cocoons under leaves drawn against the sides of the glass in which they were confined. The maximum length of the cocoons is one inch and one-half. The silk of which it is composed is of a bronze color, and in so small a quantity as to permit the larva to be distinctly seen through its meshes. On the 11th, they changed to pupæ of a chestnut color, broadly banded with testaceous at the incisures.

The pupæ, after wintering in a cold apartment, were transferred early in April to a warm room. On the 26th of April, from the three pupæ, two males and one female were disclosed. The "vitreous space" in the wings of each is thinly covered with scales.

On September 19th of the following year, another of the larvæ was taken from the same snowball, which made its cocoon on the day following. In the month of September of the two succeeding years, leaves were noticed which had probably been eaten by this larva, indicating it to be an annual visitant of this particular shrub.

I have collected the imago also at Utica, N. Y.

III. ON THE LARVA AND PUPA OF THYREUS ABBOTII SWAINSON.

Male larva.—Head large, of the diameter of the first segment, subquadrate, shagreened, two broad stripes of brown on the front, behind which is a subtriangular whitish patch, occupying all the lateral portion except a small patch of brown posteriorly; the clypeus half as long as the head. Collar pale yellow, divided on each side by a narrow dark brown line, which is continued over the following segment. Body reddish-brown, with numerous longitudinal linings in darker brown; dorsally and extending half-way down the sides is a series of nine sharply defined, bright yellow spots, which commence on the second annulet of a segment and extend backward to the incisure (leaving intermediate transverse reddish-brown bands of a single annulet), and are convex on their sides; the first spot on the second segment is triangular, the second is suboval, and the others of a uniform outline; on the sides is a stigmatal series of yellow spots, one to each segment, of which the first three and the last three are confluent; the six intermediate ones are of a uniform subtriangular outline, the last four of which have their lower rounded angle reaching downward on the base of the prolegs, their anterior angle in range with the front margin of the dorsal spot and touching the inferior portion of the stigma, and their posterior angle resting in an ovoid outline on the first annulet of the following segment, or impinging in a point on the second annulet at a height of the superior portion of the stigma. On the eleventh segment is a hump, encircled at the base with a delicate black ring, and surmounted by a vitreous oval tubercle of a fuscous color inclosed by a whitish line, which line is reflected and continued in a circumscribing circle embracing a black curved spot on the front and sides of the oval tubercle. From the base of the tubercle backward to the incisure and ranging laterally with the adjacent dorsal spot is a yellow supra-anal spot. The subcordate anal shield is of a yellow less bright than the spots. The legs are pale red; the prolegs are marked exteriorly with a narrow quadrilateral black spot surrounded with a whitish shade. The ventral region is red, with two rows of pale yellow spots.

The segmental annulets of this larva differ somewhat from those of the Sphinx proper, in that the eighth is subdivided so as almost to form an additional one, and the first has a depressed line subdividing it laterally.

The larva from which the above description was drawn, was taken, July 29th, feeding on the grape-vine. It had nearly matured, measuring two and one-half inches in length.

On the 2d of August, the dorsal spots which were previously yellow had changed to brown, and the lateral ones to a sordid yellow. The larva having fully matured, endeavored to escape from the jar to seek a place for its pupal change.

August 4th, the larva formed a little cavity on the surface of the ground, and covered itself with some pieces of leaves loosely spun together, intermingled with grains of earth. It transformed to a pupa August 9th.

Pupa.—The pupa measured one inch and three-tenths long, by 35-100ths of an inch broad; color, dark brown; head-case, as seen from above, prominent, broad, rounded in front, with the eye-cases projecting; tongue-case buried, extending to the tips of the wings; antennæ-cases, reaching to the end of the middle leg-cases; dorsally, the second segment is moderately wrinkled; the third is narrowed medially by the convex margins of the second and fourth segments; caudal spine polished, short, bifid, with a rugose, flattened, triangular base of twice the length of the spine.

The imago from the above emerged on the 5th of April.

The larva of *T. Abbotii* is peculiarly interesting from the fact that its two styles of ornamentation, in marked contrast one with the other, indicate the sex of the insect, no other instance of which, among the Lepidoptera, is known to us. The dorsal and lateral series of spots, yellow as described above, but frequently and perhaps usually of a pale green color, denote the male; the female being brown, without any trace of the above spots, but with interrupted, dark, subdorsal and stigmatal bands and numerous small longitudinal patches.* The following is a more particular description of it:

Female larva.—Length, two and two-tenths inches; diameter, thirty-seven hundredths of an inch. Head semi-oval, shagreened, a medial depressed line superiorly, two broad brown stripes in front, bordered with paler brown, shading into darker brown behind the eyes. Body cylindrical, with the three anterior segments tapering; dorsally dark brown, shading to lighter on the sides; the annulets with large, subquadrangular spots of light brown; third, fourth and

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* For an excellent representation of this sex see *Harris Ent. Corr.*, pl. iii, fig. 1.

fifth segments with a bluish shade dorsally; an indistinct lateral brown stripe, more conspicuous on the first three segments, running into the head stripe; the first two segments have also a brown dorsal line; below the stigmata is a brown stripe less distinct than the lateral one. Caudal tubercle moderately elevated, shining black, surrounded with dark brown. Caudal shield and plates reticulated with dark brown. Prolegs dark brown exteriorly, with a light band near the base.

In the larvæ of *Deilephila lineata* (Fabr.), variations almost as marked as the above, have been observed and figured by Mr. Riley.* It is not improbable that these differences may also prove to be sexual characteristics.

The pupation of *T. Abbotii* is not uniform, and consequently diverse statements appear respecting it. Clemens states that it "takes place in a superficial cell;" and in his generic diagnosis that "it prepares for pupation on or near the surface of the ground." Riley, who has reared the larva, also represents the pupa as "formed in a superficial cell on the ground."† Harris, in observations on some of the larvæ which he had received, writes, "the green-spotted one [male] went into the ground; the others [females] * * * chrysalis on top of ground July 14th."‡ A female brought to me on the 29th of July of the present year, buried in the ground, while the male described above transformed on the surface.

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* *Third Rep. Ins. Missouri*, 1871, pp. 141, 142, figs. 61, 62.

† *Second Rep. Ins. Missouri*, 1870, p. 79.

‡ *Entomolog. Correspondence*, 1869, p. 284.

IV. ON THE LARVA OF PHILAMPELUS ACHEMON (DRURY).

Egg.—Found on the under side of a grape-leaf, July —. No description was taken, but from recollection, it was of a larger size than those of other sphinges, and nearly round in form. A few days before its development, it was irregularly marked with light red. From the shell having been eaten by the larva after its escape, it could not be ascertained if the color was permanent, or if the shell was colorless and transparent, as are all the sphinx egg-shells which have come under my observation.

Young larva.—The larva emerged July 10th, measuring 11-100ths of an inch, and with a uniform light green color. Its caudal horn was very conspicuous, being one-half the length of the body, very slightly tapering, straight, of a reddish-brown color, and carried perpendicularly to the body.

First molt.—The time was not noted. No change in appearance was observed except in size. Previous to its second molting, its length was 53-100ths of an inch, with a diameter of 3-100ths of an inch. Color, light green, with white dots on the annulets, a subdorsal stripe of regular white spots, and indistinct lateral bands of similar spots directed anteriorly. Head of a uniform delicate green, without stripes or spots. Horn one-fourth of an inch long, dark reddish-brown, covered with minute cilia, and with a prominent green base, borne erect, with its tip directed anteriorly; from the base of the horn, a reddish-brown line, extending to the anal shield. Legs green. The anterior segments of the body are moderately enlarged.

Second molt—July 15th. The body marked as in the preceding stage. The horn of a lighter shade of reddish-brown, and its tip darker than before; anterior to it, on its base, of which it now occupies the posterior portion, a small triangular black spot, with its apex in front.

A day preceding its next molting, the larva measured 8-10ths of an inch in length, with a diameter at the sixth segment of 15-100ths of an inch. Its fourth, fifth and sixth segments are enlarged. The lateral stripes are well defined. The lateral bands show indistinctly, in a yellow-green spot nearly surrounding the stigma, and in another anterior to it on the second annulet; the four posterior bands are more conspicuous than the other two; horn, one-fourth of an inch long, of a fulvous color, and with its tip curving toward the head.

Third molt—July 22d. Immediately after the change it presented the following features: color light yellow-green; the annulets of the segments with whitish granulations, of which those on the lateral portions of the third and fourth segments are annulated with black; lateral bands, cream-colored, margined with black, having the characteristic outline of maturity, showing the three component sub-oval patches, of which the posterior is the largest, and incloses the stigma except at its upper part. Head smooth, of a uniform delicate green. Horn four-tenths of an inch in length, slender, bending anteriorly, ciliated, of a light reddish color, merging into a rose-color at the tip; its base occupying less than the posterior half of the tubercle; anterior to the base is a sub-triangular black wart resting on the crown of the tubercle—the development of the "small triangular black spot" of the preceding stage; the tubercle is yellow, almost surrounded near its base with a band, the extremities of which, instead of meeting, curve upward to the horn posteriorly. Anal shield and plates, legs and prolegs of a uniform green.

A short time after molting, a change of color was observed, and at the lapse of six hours it had assumed a salmon color. After a night's feeding, it was found to be of a reddish-brown color, deeper than that which it ordinarily bears at maturity, and in marked contrast with its former garb. A figure taken of it at this time represents it as one inch and one-fourth long, 12-100ths of an inch in diameter at the central segments, and with a horn, 34-100ths of an inch in length, regularly curving anteriorly from its base to the tip.

Fourth molt—July 27th. Head and body reddish-brown, but of a lighter shade than before. Caudal horn absent, its former position on the tubercle indicated by an oval spot having a central black dot. Tubercle more prominent than in the preceding stage.

The mature larva measured three and one-tenth inches in length, by one-half an inch in diameter, when at rest, at which time its small head is nearly hidden within the first segment, which is withdrawn within the second, over and in range with which projects the third segment, presenting a front almost perpendicular to the body. The posterior segment also descends almost perpendicularly from the tubercle to the terminal prolegs.

The descriptions and figures already published of this larva,* render a further account at the present unnecessary. The excellent figure given of it by Mr. Riley cannot fail of securing for it ready identification.

* Clemens: *Jour. Acad. Nat. Sci. Ph.*, 1859, p. 155. Harris: *Treat. Ins. Inj. Veg.*, 1862, p. 325, f. 150. Lintner: *Proc. Ent. Soc. Ph.*, 1864, v. iii, p. 660. Harris: *Ent. Corr.*, 1869, pl. 3, f. 11. Riley: *Sec. Rep. Ins. Mo.*, 1870, pp. 74, 75, f. 49.

V. SMERINTHUS GEMINATUS SAY, AND ITS SUPPOSED VARIETIES.

A number of eggs were deposited June 12th, by a pinned specimen of the above named Sphinx. An average of twelve of the eggs gave for their longest diameter 74-1000ths of an inch; for their shorter diameter 57-1000ths of an inch; they were slightly flattened, and of a pale green color.

On the morning of the 19th, three larvæ were found in the box, and through the transparent shells of the undeveloped eggs (appearing of a dull green), could be seen the dark caudal horn of the inclosed larva, and the black mandibles busily employed in wearing an opening through the shell. Two or three had made small openings which they were engaged in enlarging, by biting off small portions from the margins.

Young larva.—The young larva was of the length of two-tenths of an inch. Color uniform pale green. Head subglobular, one-half broader then the body, with the eyes and mandibles black. Caudal horn fuscous, lighter at the base, slightly tapering, straight (curving forward as it emerges from the shell), and carried at an angle of about 85°.

Larvæ continued to emerge during the day, the last appearing in the evening. Upon willow leaves being given them, they commenced feeding thereon. On the third day, traces of the lateral bands and a subdorsal line in lighter green were seen. When disturbed they threw their body upward, supporting themselves on their terminal and one or two pairs of prolegs.

On the evening of the 24th, they commenced taking position for molting. At noon of the following day, one had molted, and by noon of the 26th all but one had undergone the change, presenting the following features:

First molt.—Head triangular, granulated, bordered laterally with a row of larger granulations which culminate at the apex in two tubercles. Body with whitish granulations on the annulets: lateral bands consisting of yellow-green papillæ which extend over three-eighths of one segment and the whole of the two following: subdorsal line of whitish granulations, indistinct, until before the first lateral band where it becomes a thoracic stripe of transversely elongated yellow papillæ, continuing to the collar. Caudal horn straight, pointed, spinous, yellow laterally, brown anteriorly, and with a narrow brown stripe posteriorly. Legs roseate; prolegs green.

Second molt.—June 29th, and of the last two larvæ, on the 30th (thirty in all). Length at rest 45-100ths; diameter 11-100ths of an inch. Lateral stripes of the head rectilinear from the front of the eyes to the apical tubercles. Body pale green, dorsally whitish green; in the lateral bands the first three papillæ are inconspicuous, and those on the first three annulets of the two following segments are smaller than the others and geminate; on segments one to seven, is a small red spot placed on the seventh annulet, above the subdorsal and thoracic lines and anterior to the first four lateral bands. Caudal horn slightly curved, yellow, narrowly lined with reddish-brown anteriorly.

On the morning of July 3d, several had taken their position for molting on the under surface of the leaves, suspended by their terminal, and one or at most two pairs of prolegs, with their body hanging downward. On the portion of the leaf beneath them (in most instances a part of the midvein), for about the breadth of the body and two-thirds of its length, a slight webbing of silk had been spun to serve as a foothold. The head was partially withdrawn from its case, showing a translucency at the tip, and a corresponding enlargement and extension of the first segment. The subdorsal lines had disappeared, while the thoracic lines were still conspicuous in their yellow papillæ. In the larger number of the larvæ, the row of small red subdorsal spots was quite distinct, especially on segments five to eight inclusive, where they occupy the seventh annulet and encroach on the eighth. Length at rest, one inch; diameter 12-100ths of an inch.

Third molt.—July 4th probably, as when again observed on the morning of the 6th, all but two had molted, and most of them had increased materially in size, the largest measuring one inch and six-tenths in length. Immediately after the molting, they were one inch and one-fourth long, by 14-100ths of an inch in diameter. When their colors had developed, they presented the following appearance:

Lateral stripes of the head, yellow. Lateral abdominal bands and thoracic stripe, pale yellow with whitish papillæ, the bands occupying of three segments, three-eighths, the whole, and six-eighths respectively. Caudal horn straight, acutely granulated, pale violet. Anal shield with white granulations as the body. Legs roseate. Stigmata elliptical, dark red: above each stigma (except at the extremities) at about three-fourths its length, is a short delicate hair, proceeding from a minute granulation on the fourth annulet, and directed downward; beneath the stigma, at a distance of about its length, are two similar hairs directed backward, proceeding from the summit of a slightly larger granulation.

On the morning of the 12th of July, quite unexpectedly, it was found that six of the larvæ had left the willows, had undergone a change of color to a sordid apple-green, and were endeavoring to escape from confinement, thereby indicating their having attained maturity, and a readiness for their pupal change. It was the first instance which had come under my observation of pupation in the sphingidæ preceded by only three moltings. That the three above noted, were all that these larvæ had undergone, was beyond all doubt, not alone from the careful observations made, but each cast head-case had been carefully preserved, and of these there were but the three sets.

Mature larva.—Length at rest, one inch and nine-tenths to two inches. Color pale green, whitish dorsally. Head triangular, the apex not rising above the first segment, granulated in pale green anteriorly and in white laterally; the lateral stripes yellow, having within them a row of larger granulations increasing in size to the apex, where the two superior ones are papilliform and of an orange color. Body moderately tapering in the anterior segments: the seven lateral bands pale yellow, except the posterior one which is bright yellow, the anterior one obsolete; their extent, two-eighths to three-eighths, the whole, and from five-eighths to seven-eighths, respectively, of three segments: thoracic stripe with pearl white papillæ larger than those in the bands, commencing on the superior portion of the first segment, and merged into the first lateral band on the fourth segment at its seventh annulet, midway between the stigmata and the vascular line. Anal shield and plates granulated, of a darker green concolorous with the ventral region. Caudal horn straight, sometimes slightly curved, granulated, violet, with fuscous acute granulations at its tip occasionally. Stigmata elliptical, red, except the first which is orange. Legs roseate interiorly, fuscous exteriorly; prolegs green.

Pupation.—On the evening of the 12th, the above larvæ were placed, for their pupation, in a 9 × 15 box, containing five inches of earth mixed with one-third part of hard wood sawdust, and moistened to a packing consistency. Showing a disposition to travel over the surface of the ground, holes were made with the finger in which they were dropped head downward; they readily availed themselves of the assistance, and in a few minutes all had buried themselves out of sight. On the morning of the 13th, twenty-one additional larvæ were ready for pupation, and were placed in the same box with the above, in which they soon buried themselves; none reappeared above the ground, as the Smerinthini in most of my experiments in rearing them heretofore, have shown a tendency to do, probably from the omission of such a preparation of the ground as was made for the present colony. On the 14th and 15th, the remaining nine larvæ entered the ground and remained therein, in a small box (6 × 9 × 4), divided into compartments by card partitions, as a preventative against interference in the construction of their cells.

Perfect insect.—On the 30th of July, a male imago was found in the morning to have emerged from pupa, eighteen days after the first larva entered the ground; on the 31st, five emerged; August 1st, nine (five males and four females); on the 2d, two; on the 3d, eight (six males and two females); on the 4th, four; on the 10th, two, and the last. From thirty-six larvæ, thirty-one imagines were obtained.

Metamorphoses.—The length of time required for the several changes above recorded is as follows:

From deposit of egg to disclosure of larva	7 days.
disclosure of larva to first molt	6
first molt to second molt	4
second molt to third molt	5
third molt to earthing	8
earthing to the pupa, probably [*]	5
the pupa to the imago	13
Development of the ovum	7
Development of the larva	28
Development of the pupa	13
Development of the insect	48

Double brood.—These observations establish the fact not previously recorded of two annual broods for this species, occurring in the months of June and August; of these, captures have been made by me as early as June 9th, and as late as August 16th. It is probable that the larvæ from which are produced the first brood of moths, will be found to undergo four moltings.

Variety.—Among the above imagines was a female, having but a single blue pupil on the black ocellated spot of the secondaries. The occurrence of this variety is peculiarly interesting from the fact, that from specimens differing from the type of *S. geminatus* mainly in having but a single pupil, two other species seem to be based, viz.: *Sphinx ocellatus Jamaicensis* of Drury, and *Smerinthus Cerisyi* of Kirby.

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[*] As observed in *Ceratomia quadricornis*, Proc. Ent. Soc. Ph., vol. i. p. 291, *Sesia Buffaloensis* and *Thyreus Abbotii*, pp. 113, 115, of this report.

Supposed varieties.—Drury's *Jamaicensis* is cited by Clemens as a synonym of *S. geminatus*, although its habitat is given by Drury as "Jamaica." Grote and Robinson include it in their catalogue of North American Sphingidæ, as a distinct species,* remarking of it "it seems to us, judging from Drury's figure and description, quite distinct from the northern species from the Atlantic district."†

A careful comparison of Drury's figure with our variety, leaves scarcely a doubt of their identity. In the shape of the wings they correspond closely, the principal difference being in the less rounded anterior angle of the secondaries of the figure, which difference, however, is less than that presented in the apices of the primaries of the figure, showing the representation to be not strictly reliable. It is probably accidental, that in the markings of the primaries, the figure conforms more closely to our variety, in the near approach just below the first median nervule of the two bands crossing the middle of the wing, than it does to any other specimen of *S. geminatus* which we have seen. The secondaries of the two correspond in their general color, margins, central red shade, and black spot with its hook like process running from it to the anal angle, quite as well as could be expected, from the indifferent execution of the figure: in the location of the pupil on the black spot, a strict agreement between the two, is hardly possible, for while in our variety, the suboval pupil occupies the superior half of the spot, in the figure the right hand oval pupil is placed centrally on the spot, and the round left hand one occupies the inferior portion. The description ‡ is faithful to our variety in every particular.

Additional evidence of Drury's *Jamaicensis* being a simple variety of *S. geminatus*, and probably erroneously assigned to Jamaica, may be found in the fact that Mr. Grote has not met with the species in the "very large entomological material" received by him from Cuba, constituting the Poey collections, and embracing fifty-four species of Sphingidæ, nor indeed with a single member of the tribe of Smerinthini.* The species could hardly fail of representation in these collections if it occurred in the neighboring island of Jamaica, a locality, it may be remarked, still more remote than Cuba from the "Atlantic district" (Leconte), to which our American Smerinthini would seem almost to be confined.

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* *Proc. Ent. Soc. Ph.*, 1865, vol. v., p. 160.

† Loc. cit., p. 185.

‡ *Upper side.*—Antennæ pectinated and brown. Head and thorax soft dun-colored, but dark brown above. Abdomen dun. Anterior wings delicate fine grayish, light brown next the shoulders and tips; the remaining parts being clouded with dark olive brown colors. Posterior wings red in the middle, but along the external edges dun-colored; having a large black spot placed near the abdominal corners, the middle of which is blue, and imperfectly resembling an eye. All the wings are angulated.

Under side.—Breast and abdomen dun. Anterior wings red in the middle, but along the anterior edges ash-colored, which runs to the tips where it forms a crescent, the inner part being dark olive brown; the external edges are olive brown, but lighter than the crescent. Posterior wings clouded with olive brown and ash-color; having a double ash-colored bar crossing them, which rises at the anterior edges of the anterior wings, and running circularly, ends at the abdominal edges of the posterior.—*Westw. Drury's Illus. Exot. Ent.*, 1837, v. ii., p. 47.

S. Cerisyi of Kirby, the description of which is appended for comparison,† is, in all probability, a simple variety of *S. geminatus*, in which the superior of the two blue markings has retained its normal crescentic form, and the inferior one instead of its usual suboval shape, has also become crescentic—the tips of the crescents approximating, with their concavities directed toward one another, thus presenting "a black pupil, *nearly but not quite* surrounded by a blue iris." In some of my specimens, quite an approach to this form is shown.

Kirby's figure better represents our species than Drury's, the primaries being very well portrayed, except in the addition of a moderate excavation of the external margin, between the second and third median nervules. The black spot of the secondaries is less extended toward the base than usual in *S. geminatus.* In this latter particular and in the general shape of the spot, the figure approaches the European *S. ocellatus*, though differing materially from that species in the excavated apex of the primaries (acute in *ocellatus*), and in a more conspicuous excavation at the posterior angle of the same wings.

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* List of the Sphingidæ, Ægeridæ, Zygænidæ and Bombycidæ of Cuba.—*Trans. Amer. Ent. Soc.*, 1870, v. iii., p. 183.

† Body ash-colored: thorax with a large trapezoidal brown spot dilated next the abdomen: primaries angulated ash-colored, with a transverse series of brown submarginal crescents in a paler band, between which and the posterior margin is another obsolete paler one; above the crescents is a straight whitish band, and a linear angular forked one, under the internal sinuses of which the wings are clouded with dark brown; underneath, the above markings of the wings are very indistinct: the secondaries are rose-color, paler at the costal and posterior margins; underneath they are dusky cinereous, with a whitish band coinciding with that of the primaries, a transverse series of crescents and a dentated brownish band, all rather indistinct: but the most conspicuous character of the secondaries is a large eyelet situated at the anal angle, consisting of a black pupil, nearly but not quite surrounded by a blue iris, and situated in a black triangular spot or atmosphere, which extends to the anal angle, and is surmounted by some blue scales: the abdomen above is dusky ash colored.

This insect appears to be the American representative of *S. ocellatus*, from which, however, it differs considerably. It comes very near *S. geminatus* (Say, *Am. Ent.* i. t xii,) but in that the eyelet has two blue pupils. Taken in North America, locality not stated.—*Faun. Boreali-Americana*, 1837, vol. iv., p. 301.

The omission from the figure of an angle in the margin of the posterior wings at the submedian nervure, must, we think, be an error in representation, as also the termination of the anal process of the black spot, not in the anal angle, but wholly within the internal margin. Errors so obvious and other probable ones, must necessarily afford a poor basis on which to sustain a valid species.

Mr. Grote, in his valuable papers on American Sphingidæ, has advocated the specific distinctness of *Cerisyi.*[*] In one of them he remarks: "The fact that *Cerisii* Kirby, is certainly distinct from *S. geminatus* Say, an opinion I have entertained since studying Kirby's description and figure, has been recently ascertained by the discovery of specimens, as I am informed by Mr. S. Calverley." At the present I have no means of determining the character of the specimens referred to, but I cannot believe that they will prove to be different from the exceptional form obtained by me from the deposit of *S. geminatus* eggs above recorded.

Mr. W. H. Edwards informs me that he has regarded *S. Cerisyi* as a distinct form. He has, in his collection, a specimen taken far north, by Kennicott, believed to be the only one in the country.

Kirby's type is probably in the collections of the British Museum, where, it is stated, the insects described in *Fauna Boreali-Americana* were deposited.

From the very brief description of *S. opthalmicus* given by Boisduval,[†] it was thought by Clemens to be possibly a variety of *S. geminatus*, having but a single eye in the ocellated spot.[‡] Grote and Robinson in their catalogue of N. A. Sphingidæ, have recorded it as a distinct species.[§]

Through the kindness of Mr. James Angus of West Farms, N. Y., I have had the privilege of examining a beautiful specimen of the species, received by him from California. It is structurally distinct from *S. geminatus*, and is closely allied to *S. ocellatus* of Europe, from which however it differs materially.

As near as I could determine without dissection, the antennæ consist of about forty joints having longitudinally on them a single series of thin, nearly square laminæ, each equal in length to the joint upon which it is placed ; the laminæ bear on their two sides two rows of fine cilia, extending from a common point on the middle of their base to the two outer angles, regularly increasing in length as they recede from the originating and diverging point, the rows slightly curving toward one another and uniting at their tips. As seen from above, the connivent cilia fringing the antennal stem, are alone visible, in their greatest length nearly equaling the pectinations of *S. geminatus.* In this latter species, from the middle of each antennal joint, are given out two broadly diverging, slender, curved, cylindrical, apically rounded pectinations which are margined with short and fine cilia ; the pectinations are thirty-nine or forty in number.

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[*] Notes of Cuban Sphingidæ.—*Proc. Ent. Soc. Ph.*, 1865, vol. v., p. 40.

[†] Le *S. opthalmica* assez rapproche de notre *ocellatus*, plus voisin de *Gemina* de Say, mais l'oeil n'est pas double et il differe de toutes les especes du meme groupe par sa large bande brune, anguleuse, qui traverse le milieu des ailes superieures.—*Ann. Soc. Ent. France*, t. iii., 3me ser. xxxii.

[‡] *Jour. Acad. Nat. Soc. Ph.*, 1859, p. 184.

[§] *Proc. Ent. Soc. Ph.*, 1865, vol. v., p. 160.

The apex of the primaries is acute in *S. opthalmicus* as in *S. ocellatus* (excavated in *S. geminatus*), but less curved apically on the anterior margin ; it is without the white-bordered semioval brown patch which is a feature in *geminatus.* The excavations of the hind margin approach nearer to *ocellatus* than to *geminatus.* The posterior wings are less developed costally than in either of the above two species. The ocellated spot is quite small, having a diameter between the crescents of about one-half that of the thoracic spot (in the other two the diameter exceeds that of the thoracic spot) ; it rests anteriorly on the second median nervule, centers on the first, extends to midway between the latter and the submedian nervure, and is removed one-half its longest diameter from the outer margin. It consists of a black spot and two slender, subequal crescents almost uniting at their tips, of which the anterior one is placed just within the anterior margin of the spot which is lost beneath the long, rose-colored basal hairs, and the posterior one forms its posterior margin — the whole presenting a well defined ellipse, having its transverse diameter on the submedian nervure. From opposite the center of the spot interiorly, disconnected from it by a brownish line, a short black dash points toward the anal angle, but is merged in an ochreous-brown shade running to the angle, and thence acutely reflected toward the base. The thoracic spot is ochraceous-brown, straight in front, covering all of the thorax except a white bordering to the gray tegulæ. The colors of the abdomen and wings differ materially from those of the two species with which it is compared, for while they are characterized by shades of deep brown, in this, the colors are fawn or pale ochraceous-brown. Its expanse is two and six-tenths inches ; length of body one inch.

Synonymy.—The following table of reference and synonymy is presented, in the belief that it will prove to be correct.

Sphinx ocellatus Jamaicensis Drury. Illus. Nat. Hist., 1773, v. ii, p. 43, pl. 25, figs. 2, 3.
Smerinthus geminatus Say. Amer. Ent., 1824, v. i, p. 25, pl. 12.
S. geminata Harr. in Cat. An. & Pl. Mass., 1835, p. 71.
S. Jamaicensis Westw.-Drur. Ill. Ex. Ent., 1837, v. ii, p. 47, pl. 25, figs. 2, 3.
S. Cerisyi Kirby. Faun. Bor.-Amer., 1837, v. iv, p. 301, pl. 4, figs. 4, 5.
S. geminata Harr. in Amer. Jour. Sci.-Ar., 1839, v. xxxvi, p. 291.
S. geminatus Walk. Cat. Br. Mus., Lep., 1856, pt. 8, p. 246.
S. geminatus Clem. in Jour. Acad. Nat. Sci. Ph., 1859, p. 183.
S. geminatus Morr. Syn. Lep. N. Amer., 1862, p. 210.
*S. excæcatus** Lint., in Proc. Ent. Soc. Ph., 1864, v. iii, p. 665 (larva).
S. geminatus Gr. & Rob., in Proc. Ent. Soc. Ph., 1865, vol. v, p. 160.
S. cerisii Gr. & Rob. ibid., et List Lep. N. A., 1868, p. 4.
S. jamaicensis Gr. & Rob., in Proc. Ent. Soc. Ph., 1865, vol. v, p. 160.
S. geminatus Pack. Guide Stud. Ins., 1869, p. 275 (vena. post. wing).

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* An erroneous determination, the larva described on page 666 of the Proceedings being that of *S. excæcatus*.

VI. TRANSFORMATIONS OF DAREMMA UNDULOSA WALKER.

A moth of this species, with broken and denuded wings and contracted abdomen, which was taken on the 8th of July, deposited eight eggs the following day in the box in which it was confined, and died three or four days thereafter. Upon examining the box on the 14th, there were found the transparent shells of six of the eggs from which the larvæ had emerged, the other two proving infertile. Three of the larvæ had escaped, and the remaining three were quite feeble from their compulsory fast of probably a day or two, but very soon commenced feeding on some tender leaves of ash (Fraxinus) which were given them. To insure them a continual supply of fresh food, they were placed on a leaf of a growing ash and inclosed in a gauze net for their protection.*

Young larva.—The larva is of a very pale green color throughout. showing no stripes nor bands. Its length is 18-100ths of an inch. Its caudal horn is cylindrical, straight, of a light green color, except its tip, which is brown, and measures 8-100ths of an inch.

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* The rearing of larvæ upon growing plants, as above referred to, is becoming a favorite method with lepidopterists, for several reasons: It affords a constant supply of suitable food, free from the partial decomposition which commences almost immediately upon the plucking of the leaf, or from the rapid change, commonly known as "souring," which a twig or stem undergoes when placed in water. The great sensitiveness of young larvæ to improper food, is well known to those who have reared from the eggs, by the usual method of plucked food, broods of our sphinges, in which a mortality of one-half has often been encountered before the first molting. The larvæ require but little attention; during their infancy, the few leaves upon which they are at first placed, may suffice for a week or two; as they attain a size which demands a larger supply of food, as often as the inclosed leaves are consumed, it is only necessary to open the net, turn out the excrementitious matter, clip off the defoliated portion of the twig, and tie again farther down the stem. It prevents the injuries which so frequently prove fatal to young larvæ, when the slightest degree of force is employed in removing them to fresh leaves. In addition to natural food, it also gives a natural exposure, an important consequent of which is, that a description of the larva need not be imperfect from abnormal coloration, which so frequently is the result of in-door rearing.

There are, however, some risks to be incurred by this method. The larva sometimes deserts the leaf for its enveloping net, when of so small a size, as not to be able to protect itself against being seized and destroyed by ants or other insects; and this traveling propensity is often the first indication of approaching molting, which is always accompanied by diminished powers of defense. As I know of no means by which to prevent such occurrences, which are very annoying when the larva happens to be rare, I would, in such cases, defer placing them out of doors until their second change had given them a degree of safety in the size attained. As they approach maturity, the protection of the net does not wholly exempt them from the attack of their natural enemies, the Ichneumonidæ, which, readily drawn thither when several larvæ are associated, may often be seen prospecting over the net for a position whence they may reach with their ovipositor the body of their prey within. Having thus lost a number of rare larvæ, I am now usually successful in preventing its recurrence, by constructing the net of a large size, and extending it with two or more wire rings, so as to place the inclosed larvæ while upon the leaves, which they rarely leave after their second molting, out of ovipositor reach.

When nearly ready for their pupal change, they should be removed from the tree, and fed to maturity in a box or wired breeding cage, to guard against their liability to escape at this period, by forcing an opening in the netting.

First molt.—On the 21st of July their first molting occurred. On the 26th, when about to undergo their next change, they had attained the length of seven-tenths of an inch, and presented the following features: Head light green, with a yellow lateral stripe. Body light green, marked conspicuously with a subdorsal yellow stripe, of the breadth of two of the annulets, which commences on the first segment and terminates in the last lateral band. The lateral bands are seven in number, of a yellow color, but are less conspicuous, except the posterior one, than the subdorsal stripe; each band commences at the anterior margin of a segment in range with the stigmata; it enters the subdorsal stripe at the fifth annulet, and emerges therefrom at the incisure, whence, after rising slightly above the stripe, it is recurved and touches it again, nearly reaching the following incisure. The caudal horn is straight, 9-100ths of an inch long, and of a red color. The stigmata are not visible with an ordinary magnifying glass, but their position is indicated by a short horizontal yellowish line, sub-centrally on the segment. The legs and prolegs are green.

Second molt.—This change occurred during the night of July 26th and 27th. When in readiness for the next molting on the 31st, their length was 85-100ths of an inch. The head shows granulations and has broad lateral stripes of yellow which nearly meet at the apex. The subdorsal stripe is obsolescent, being more distinct on the thoracic segments; lateral bands quite distinct, of a bright yellow; the three anterior and the seventh with a shade of red margining them in front. Caudal horn straight, with short spines which are brown on the front of the horn and behind. The legs are light red, and the prolegs green.

Third molt—August 1st–2d. On the 6th of August, a cessation from feeding, a fixed position, and a partial withdrawal of the head from its case, indicated the near approach of another molting. Length of the larva at this time, one inch and three-tenths, with a diameter of eighteen-hundredths of an inch. The head is light green, tuberculated superiorly, with the lateral stripes broad and of a whitish shade. The body is pale green; the subdorsal stripe obsolete; the lateral bands are whitish-green, bordered anteriorly with darker green, except the first and seventh, which are yellow anterior to the stigma; the bands commencing at the incisure, cross the second annulet in range with the lower part of the stigma, are contracted over the stigma, extend thence in a straight line to the next incisure, and are continued somewhat deflected over from one to three annulets of the following segment (over three on the seventh and eighth segments); this posterior portion of the band is not edged with darker green. The caudal horn is very slightly curved, rose-colored anteriorly at the base, tipped with yellow, and is covered with spinules which, except the lateral ones, are black. The anal shield and plates have black granulations. The stigmata have a white dot at each extremity, and are bordered with orange. The legs are rose-colored and the prolegs green.

Fourth molt.—The last molting during the larval state occurred during the night of August 7th–8th. On the following morning they were found feeding on the dry leaf upon which they had been resting motionless for the twenty-four hours preceding their change. Their position in each molting has been on the midvein of the leaf. The withdrawal of the head from its case at the commencement of the molting appears to be accomplished in a very brief time, if not at a single effort. In *Ceratomia quadricornis* Harris, the operation is so gradual, that its progress can be followed for a day or more. In this species, when a careful inspection has shown no indication of the separation of the case, an hour thereafter, it has been found wholly withdrawn within the skin of the anterior segment, through which the lateral bands of the head could be very distinctly seen. In *Darapsa Myron* (Cramer), the corresponding operation appears to be as quickly accomplished.

All the above moltings of *Daremma undulosa* have taken place during the night.

Food plant.—The larva, according to information given to Dr. Clemens as stated in his description of *Ceratomia repentinus* (determined by an examination by Grote and Robinson of the typical specimen of Walker to be identical with this species*), has been taken on the ash, upon which the individuals above described were reared. Mr. Grote states that he has observed it numerously on the lilac (*Syringa vulgaris*) on Long Island. It will probably also be found on the privet (*Ligustrum vulgare*),—a larva which must have been either this species or *Sphinx cinerea* (*chersis* of Hübner), having been reported to me as occurring on this food-plant.

Pupation.—Before entering the earth, it undergoes a marked change in color. One taken from a fence August 27th, presented a soiled white appearance, in which only a trace of its original green was visible; the position of its lateral bands could with difficulty be traced. It buried in the ground the following day, and constructed its cell of the usual ovoid form of the cells of the sphinges, at a depth of four inches. The imago emerged the following June, enabling me to determine the species, which the altered appearance of the larva did not permit of doing.

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* *Trans. Amer. Ent. Soc.*, 1868, vol. ii, p. 76.

Pupa.—Length one inch and three-fourths; diameter one-half inch; color dark brown; head-case depressed, shagreened; eye-case slightly prominent, with a smooth, impressed line inferiorly, and a central one on the crescent, which is wrinkled transversely. Pronotum shagreened, quite depressed anteriorly, with a medial line; stigma fusiform. Mesanotum minutely shagreened, with an inconspicuous medial line. Metanotum with a transverse line anteriorly, posterior to which it is minutely wrinkled longitudinally. Abdominal segments punctulated, and each divided superiorly in about four parts by depressed transverse lines. Eleventh segment with a dorsal, transverse, oval depression. Tongue-case buried, reaching just below the tips of the middle leg-cases, having anteriorly a few transverse plaits near its medial line, and a few longitudinal ones near the antenna-case. Antennæ-cases in the female extend to half-way between the tips of the anterior and the middle leg-cases, showing the joints distinctly, with a granulation on each. Anterior leg-cases broad, prominent and rugose over the femur. Wing-cases somewhat granulated at their basal region, and smooth elsewhere. Spine rugose, subtriangular, constricted at the base.

As will be seen from the above description of the larva, it has no structural affinity with that of *Ceratomia quadricornis.*[*] The species has therefore very properly been removed from the genus in which Dr. Clemens had been led to locate it, from representations made to him by one who claimed to have reared its larva repeatedly, and described it as strongly resembling that of *C. quadricornis.* To Mr. Grote belongs the credit of discovering structural differences in the imagines of *C. quadricornis* and *D. undulosa*,[†] which differences are fully sustained in their earlier stages.

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[*] *Proc. Ent. Soc. Phil.*, 1862, vol. i, p. 290.

[†] *Proc. Ent. Soc. Phil.*, 1865, vol. v, p. 190.

VII. NOTES ON PLATARCTIA PARTHENOS (HARR.) PACK.

Some eggs deposited by a captured moth, disclosed their larvæ on July 20th. The young larvæ were one-tenth of an inch in length, of a fulvous color, with black tubercles and long fuscous hairs.

The first molting occurred July 26th and 27th. The larvæ were now one-fourth of an inch long, with two prominent black subdorsal tubercles on the fourth and tenth segments; the hairs were one-tenth of an inch long.

The second molting commenced July 30th and terminated on August 1st.

The third molting commenced August 6th.

The fourth molting commenced August 11th, after the larvæ had maintained a fixed position for twenty-four hours.

The fifth molting commenced August 16th.

The sixth molting extended from the 23d to the 25th of August, inclusive.*

The seventh molting: two of the larvæ which had taken positions in an angle of the box on the 28th, and had spun over them a thin web covering, molted on the 31st. On the 13th of September, two others molted; the remainder did not undergo this change. After the middle of September they ate very sparingly, many of them resting for days in one position. A few of the brood having died, about the middle of October, the remaining ones (eighteen in number) were transferred to winter quarters within a box containing chips and sawdust, and inverted on the ground beneath a bedding of leaves and earth. The few larvæ which had undergone their seventh molting, had at this time attained a length when in motion of two and one-fourth inches.

On the 1st of April, eleven of the larvæ were found to have survived the winter. These were provided with growing plants, beneath glass, for food, but manifested an indisposition to eat, seeming in a feeble condition. On the 27th of April, two of the number were observed to be feeding nicely. The others died without partaking of any food.

The two larvæ without again molting, or materially increasing in size, spun cocoons of a dark colored silk interwoven with their hairs, of a texture permitting the inclosed pupa to be seen through the threads. One only disclosed its imago (a male). Of its period of pupation, no note was made.

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* A description of the larva at this stage, is given by Mr. W. Saunders, in the *Canadian Entomologist*, 1871, vol. iii, p. 225.

The moth conforms very closely to the description given by Packard.* In the female from which the eggs were obtained, the median band on the secondaries which in the male consists of approximate orange spots, becomes a continuous orange band from its enlargement at the costal margin to near the internal margin (one-third of the distance between it and the submedian), constricted opposite the cell and on the first median nervule; the nervules which intersect it are dotted with black scales. On the fold between the median and the submedian nervures, is an orange vitta, attenuated anteriorly for two-thirds its length, enlarged and rounded posteriorly, and extending nearly one-half the distance across the wing.† The sides of the abdomen, terminal segment and anal tuft are orange, concolorous with the ground of the posterior wings; the black of the dorsum extends medially in a point over the terminal segment. Expanse of wings 2.80 inches; in the male 2.40 inches.

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* *Proc. Ent. Soc. Phil.*, 1864, vol. iii., p. 110.

† No trace of this feature appears in the figure given in *Agassiz' Lake Superior* (pl. vii., fig. 4,) of a male taken on the northern shore of the lake, nor in a male of my collection.

VIII. NOTES ON EUPREPIA AMERICANA (HARRIS.)

A moth of this species, captured in a room late in the evening* where it had been drawn by a brilliant light, deposited, after having been pinned, a number of eggs, of which, about one-half (seventy by count) were given me to rear.

Most of the eggs were deposited in an irregular mass, and a few were lying loosely in the box. They were white, of an obovate form, very slightly compressed, with a length of 8-100ths of an inch, and a breadth of 6-100ths of an inch. The larvæ emerged from the larger end, leaving a shell firm and opaque, of which only an aperture was eaten. Less than one-half of the eggs disclosed larvæ.† The date of their appearance was not noted.

The first molting was on the 13th of August. Previous to the following molt they were three-eighths of an inch long, of a reddish brown color, with intermingled white and black hairs at the extremities, and with a lateral lead-colored stripe. The head and tubercles of the body were black.

The second molt extended from August 22d to the 25th.‡ Length, one-half inch; anterior segments fulvous, with hairs of the same color. The third molt commenced August 30th; the fourth, September 9th; the fifth, and last recorded, September 20th.

The moltings were not at all uniform throughout the brood, some of the number being at this time an entire molting in advance of others.

Several days after the last change above noted, the larvæ varied in length from six-tenths of an inch, to one inch and a tenth. Having ceased feeding (and a few having died), they were placed in winter quarters with the *P. parthenos* larvæ of the preceding paper.

When uncovered in the spring, but one of the colony was found alive. It fed for about two weeks, increasing in size during that time from nine-tenths of an inch to one inch and a fourth, but died before attaining maturity.

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* In two other instances of the capture of this moth within-doors, in the same locality, during the same season, it was observed that its appearance was between the hours of *ten* and *eleven* P. M.

† The very large number of eggs borne by this moth—stated by Dr. Fitch to be seven hundred and forty-four in an instance observed by him — might account for so many (the last deposited) having failed of fertilization.

‡ It is possible, in consideration of the long interval between this and the first molt, as compared with the corresponding interval in *P. parthenos*, that an intermediate molting may have escaped observation.

Dr. Fitch, from a comparison of colors and markings, regards this species as identical with the European *E. caja* (Linn).* Dr. Packard finds indisputable distinctive features in the stouter body, shorter wings and prominent antennal pectinations of our species. Specimens, however, have been taken in Labrador, which Packard has determined to be *E. caja*, and which he represents as giving evidence of introduction. He states that "the coloration and the markings are the same, and it can scarcely lay claim to be considered as a climatal variety. The patagia are white in the Labrador specimen, and brown in the English; this is the principal distinction."

Of its larva, Packard states: "It occurred at Gore Island, in Southern Labrador, wandering over the herbage. At Caribou Island, they were found in July, in various stages, feeding on *Potentilla anserina.* The larva was also found, full fed, crawling over herbage, on June 15th, at Little Mecatina Island, and it had no doubt hybernated in this state. The body was black, with large white papillæ, from which, on the thoracic rings, rise short yellow hairs, like those on the sides of the body. Above, the white papillæ are large and conspicuous, and from them arise long, thin, mostly irregular fascicles of pale gray hairs, with shorter and fewer black hairs, the longer ones equaling in length the breadth of the body. It is of the usual size, and its tricolored hairs and white papillæ give a striking appearance to this handsome larvæ. It began to spin a cocoon June 26th, and the moth appeared July 27th."†

I know of no description of the mature larva of *E. Americana* to compare with the above. That of Dr. Fitch (loc. cit.) does not pertain to our native species, (although associated with an excellent description of the imago), but is obviously taken from European sources, and refers to *Euprepia caja.*

E. Americana has been taken in several places in Canada and in New York, in Massachusetts and on Lake Superior.

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* *Noxious Insects of New York*, Reports, 6-9, p. 234.

† *Proc. Bost. Soc. N. H.*, 1868, vol. xi, p. 34.

IX. NOTES ON EUCHÆTES EGLE (DRURY).

A colony of the young larvæ was taken on the milkweed (*Asclepias cornuti*) July 20th, collected in an irregular cluster on one of the leaves. Their appearance at this stage was so unlike that presented when more advanced, that the species would not have been suspected, but from the food plant on which they occurred.

On the 21st, having consumed the leaf on which they were feeding, they moved to the top of the jar beneath which they had been placed, where they collected in a body. They were now three-tenths of an inch in length. The head was subquadrate, glossy black. Collar fuscous. Body deeply incised, obscure green, with round fuscous tubercles dorsally, and oval ones laterally, from which radiate white hairs of unequal length, those on the four anterior and two posterior segments being longer than elsewhere, and intermingled with dusky hairs. Legs spotted with fuscous, and prolegs with a fuscous spot outwardly.

On the 23d they were found to have undergone a molting, and were traveling with a very rapid motion in every direction about the jar. Later in the day, they had again collected in a cluster, when fresh food was supplied them, upon which they arranged themselves with some degree of regularity, but not with the striking parallelism which characterizes their feeding when met with in the field.

The larva now appears with twelve rows of tubercles, disposed in two ranges on each segment, the tubercles alternating on the anterior and posterior portions of the segment.

The first segment has some short white hairs projecting over the head. On the second segment are four black pencils, each with a single hair projecting beyond the others; the two inner pencils are the longer, and the single hair extends to nearly twice the length of the pencil. The third segment has its interior pencils like those of the second, but its exterior ones are without the long hair. The fourth segment has a double pencil issuing from the two anterior dorsal tubercles, with four white pencils from the four tubercles next below. Segments five to nine inclusive have each four orange pencils curving inward and forward, of which the two anterior proceed from the two superior tubercles, and the two posterior from those next below; beneath these is a row of black pencils above a blue line which incloses the stigmata. On segment ten is a similar arrangement of pencils, but the two posterior ones are white instead of orange. On segment eleven a double, dorsal black pencil from the two anterior tubercles, two white ones posterior to these, and two black ones exterior. On segment twelve are four black pencils directed backward. The two lower rows of tubercles on segments one and three, and the three rows on four and five, have fascicular bunches of short white hairs radiating from them, as have also the corresponding tubercles on the three posterior segments. The lower row of tubercles on segments six to nine inclusive, have a few similar hairs proceeding from their lower portion. Body of the larva, pale brown. Legs shining black; prolegs fuscous exteriorly.

On August 1st, another molting occurred. On the 3d, from one of the larvæ, several parasites emerged, and enclosed themselves in small white cocoons of a slight texture, enveloped in loose wool-like threads: from these seven hymenopterous imagines of an undetermined species (all females) were disclosed on the 18th.

On the 4th, one of the larvæ had spun its cocoon, through the walls of which some parasitic larvæ emerged. By the 9th, several had made their cocoons, and all had ceased feeding. The last of the colony made its cocoon on the 12th.

On the 26th of August, an *Egle* imago emerged from one of the cocoons, which proved to be the only one obtained from the entire colony. Late in the ensuing spring the cocoons were examined, when about half of the number were found to contain untransformed shriveled larvæ, and the remainder dead pupæ.

Other attempts to rear broods of this larvæ, have been attended with about the same success, showing it to be a very difficult species to carry through to the imago state, under treatment which proves successful with many others.

On the 24th of August,—a month later than the date of collection above noticed—another colony of this larva which had apparently very recently undergone the first molting was observed feeding on Asclepias.

X. TRANSFORMATIONS OF LAGOA CRISPATA Packard.

A cluster of eggs subsequently ascertained to be the deposit of this moth, was found July 7th, 1869, at Center, N. Y., on the under side of a leaf of *Quercus ilicifolia*, arranged somewhat in a segment of a circle, three-eighths of an inch in length, and covered with a yellow-white down.

The eggs are pale green, of an elongate-oval form, measuring 2-100ths by 45-1000ths of an inch in diameter. They were attached to the leaf by their sides in two rows, with the enveloping down extending beyond them on the leaf for a space somewhat exceeding the longest diameter of the egg.

Young larva.—The larvæ were disclosed July 13th, with a length of 62-1000ths of an inch. They were of a pale yellow-green color, and were thickly covered with long, soft, white hairs, many of which were twice the length of the body. The larvæ fed on the upper surface of the leaf.

First molt—July 21st to 23d: larva limacodiform in appearance, white, oval, flattened superiorly between the subdorsal rows of short, cylindrical, fleshy, white tubercles, apparently nine in number exclusive of the terminal ones; counting these last in the stigmatal row, it consists of twelve similar tubercles; from each of these tubercles, long, white hairs of unequal length radiate, the longest of which measure one-fourth of an inch. The head is not visible from above, and the extremity to which it belongs is with difficulty distinguishable from the posterior when the larva is at rest. Its prolegs can only be seen from beneath when moving on a transparent surface.

Second molt—July 28th: length of larva, 27-100ths of an inch, diameter 12-100ths; the hairs are three-tenths of an inch long, usually uncinate, more numerous than before and nearly concealing the body. The larvæ still eat only the upper surface of the leaf within the veinlets.

Third molt—Commenced August 3d: length of larva, 31-100ths of an inch, diameter, 15-100ths. Three rows of tubercles are visible on each side of the body, of which the substigmatal ones are round, the lateral and subdorsal ones elliptical; from these tubercles proceed the long hairs, which, diverging and interlacing, cover the body.

The larva no longer confines itself to the surface of the leaf, but commencing at the margin, now eats the entire body except the veins. Its method of eating is peculiar. Extended on the surface of the leaf (usually the lower surface) at a right angle with its margin, it bends its head over the edge in a position to grasp it with its mandibles. Its collar, which is quite extensible, is thrown forward with its sides appressed closely to the two surfaces of the leaf, entirely enveloping the head. From its position, one-half of the collar is hidden beneath the body; the other half is seen on the opposite side of the leaf as a triangular fleshy piece, having its anterior edge in range with the line of the body. On one occasion while feeding, when a small bit of leaf had been detached and was held by the anterior pair of legs, the favorable position of the larva for its observation, displayed both of the lateral edges of the collar folded on the piece, and holding it between them, while within, as disclosed by the regular motion of the body and the gradual disappearance of the leaf, the mouth was in active operation, wholly concealed from even a direct front view, except when a slight elevation of a portion of the collar chanced to disclose a section of a black mandible.

When in readiness for its fourth molting, the larva at rest, measures 7-10ths of an inch long, and 28-100ths of an inch broad. From having been up to this period entirely white, the body now shows patches of coloring. Two or three days after it has affixed itself for its molt, the colors become defined in shade and outline.* There now are seen blackish bands on the terminal segments, a line of elongate black spots above the legs, a white stigmatal band with a row of blackish spots above, and an obscure salmon shade suffusing the entire dorsal region. In these colors are revealed the new clothing nearly matured which the larva is about to assume, closely folded to the body in separate pencils of hairs, and partially seen through the translucent skin.

Fourth molt—August 20th, and several following days: length 75-100ths, breadth 3-10ths of an inch. The withdrawal of the larva from its old integument occupies about five minutes of time. As the segments successively emerge, the hairs appear as wet pencils appressed to the body, which rise up as they are released from their confinement, and very soon becoming dry, diverge and entirely cover the body without any outward indication of originating in a few isolated points. The larva now presents a remarkable contrast to its former appearance, in features as follows:

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*A larva taken at Center, after its third molt, took its position for its fourth change during the night of August 27-8; the bands were visible on the 31st, and the molting occurred on the afternoon of September 1st, nearly four days having been required to complete the change.

The head is round and white; the eyes and mandibles are black. The body is white throughout. The collar has four patches of short slate-colored hairs — the inferior patches round and the superior elongated. On the first segment are eight tufts of slate-colored hairs; on the second segment are six tufts, of which the four inferior are slate and the two superior, slate mingled with ochreous; on the third and following segments, exclusive of the terminal, the lower tuft is slate with black basally, the lateral is slate and ochreous, and the dorsal is ochreous; on the terminal segment the position of the tufts was not ascertained further than that the lower is slate-colored. The slate-colored hairs of the thoracic segments superiorly, and the ochreous ones of the terminal segments, are long and projected over the extremities, and are so fine as to be readily moved by the breath; the abdominal hairs are shorter, somewhat coarser, appressed, and meet over the dorsum in a ridge. The stigmata are white, hemispherical, with an elongated subcylindrical papilla beneath the anterior one and behind each of the others. Legs five-jointed, bearing upon them several short bristles. The five pairs of prolegs on segments 6–9 and 12, are well developed and have their plantæ armed with series of black hooklets; on their base exteriorly is a small pencil of short hairs, and three still smaller contiguous pencils anteriorly, visible with a lens: the two pairs of conical prolegs on segments 5 and 10 (completing the seven pairs ascribed to this larva*), are rudimentary, without plantæ, bearing apically a few short hairs.

Sting of larva.—On several occasions subsequent to the third molting, while transferring the larvæ to fresh leaves, a slight pricking sensation was felt, which was not, however, sufficiently decided to arrest attention; a larva seemingly so inoffensive in its downy dress, and so timid as to roll itself up in a ball at any rude touch, was not to be suspected of the possession of a method of defense bestowed, in like degree, upon only two other associate Bombycideans. Later, with their increased growth, the pricking became more acute, and its source could no longer be doubted. If a larva was pressed with the back of a finger, or permitted to drop upon it from a moderate height, a sharp stinging would be felt, soon becoming more acute, and followed in a few minutes with a redness of the skin, and elevated white spots similar to the "nettle-rash." As would naturally be expected from the comparative size of the larvæ, the sting is not so severe as that of *Hemileuca Maia* (Drury), or *Hyperchiria Io* (Fabr.)*

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* *Proc. Ent. Soc., Ph.*, 1864, vol. iii, p. 336.

A critical examination of the larva, by a partial removal of its hairs, revealed the existence of clusters of short, slender, acute, white bristles, directed upward from the several tubercles of the lateral and subdorsal rows, the presence of which had previously been unnoticed, under their covering of the long hairs surrounding and effectually concealing them. Upon touching the bristles with the hand, they were found to be the source of the sting experienced.

Fifth molt.—The fifth molting through which the larvæ were observed to pass, and their subsequent changes, were not recorded. Additional collections of larvæ made at Center were thoughtlessly added to the colony, which, with other circumstances, prevented the completion of their history. Of the above collections, one of the number spun its cocoon on the 29th of August, attached to the bottom edge of the bell-jar confining it.

An alcoholic matured specimen in my possession, which had attained more than ordinary size, measures one inch and three-tenths in length, by one-third of an inch broad. Its head, drawn within the first segment is black, as are also the tips of four or five of the anterior stigmatal papillæ.

A larva taken at New Baltimore, N. Y., feeding on plum leaves, and brought to me August 31st, was more elongate than usual; its three anterior segments were clothed with hairs of a brownish shade, and the hairs of its posterior extremity were prolonged so as to form a short tail. It made its cocoon September 1st, but did not develop the imago.

Cocoon.—The cocoon is of a tawny-brown color, oval in form, often modified by the surface to which it may be attached, and occasionally contracted near its apical end; its average size, taken from fifteen specimens, is three-fourths of an inch in length, by one-third of an inch in diameter. It is of a firm, parchment-like texture, capable of sustaining considerable pressure from the edge of the nail before yielding to it. Its exterior is irregularly covered with a thin web of rather coarse threads, in which, under the microscope, a few of the plumose hairs of the caterpillar may be observed; underneath this, the outer coating of the cocoon is thinly extended over its apical end, to the extent of about one-tenth of an inch. Upon stripping away this portion, a flat surface is seen beneath, covered with a matting of intermingled hairs and silk; if this matting be removed, a moderate pressure of the fingers upon the sides of the cocoon, will cause the flattened apex to detach itself in part from the body, disclosing a perfectly fitting lid, of which its connection with the cocoon for about one-third of its circumference, serves as a hinge. The margin of the lid is slightly recurved; that of the cocoon to a greater degree, so as, in some examples, to render this portion as broad as the central diameter.

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* *Twenty-third Report on the N. Y. State Cabinet*, 1872. p.

The lid is woven by the caterpillar separately from the rest of the cocoon, and is not a section cut from it after its completion. This interesting fact, at variance with the generally received opinion upon the subject, was clearly shown, when, upon springing open the lid, there was found to be resting upon and partly overlapping its margin, and quite distinct from the matting inclosed, a packing of stout, parallel threads and hairs, not forming an entire circle, but interrupted by returns at each side of the hinge, over which its extension would not be needed; underneath this, and more closely united to the margin was a more slender silken cord arranged in like manner. The construction of the packing and its curious disposition, prior to the formation of the lid, as from their relative position it must necessarily be, is ample evidence that, in continuation of the plan adopted, the lid is subsequently woven to its shape, with the packing serving for its base and guide.

The lids are usually of an ovate form, but in some specimens they assume a subtriangular shape, or present one or more projecting angles; in such instances, these irregularities are met by complementary variations in the margin of the cocoon, by which a perfectly fitting lid is insured.

A tranverse section of the cocoon displays an ingeniously contrived structure for the firm support of the margin of the lid, without which, notwithstanding the partial support provided for it in the inflated margin of the cocoon, it might too easily yield to outward pressure from some inquisitive enemy. While as before stated, the main body of the cocoon consists of a single wall, its superior third is seen to divide in several laminæ (seven were counted in one specimen), slightly separated and carried to the proper height to meet and sustain the lid; the interior ones are thin, while that forming the inner wall is firm and smoothly coated by a gummy secretion probably from the mouth of the larva, uniform with the remaining portion of the cocoon. With the same economy of labor and of material shown in the construction of the interrupted "packing," these laminæ do not encircle the cocoon, but disappear beneath the hinge.

The separate construction of the lid, as shown in the remarkable evidences of design above recorded, is also confirmed by microscopic observation. Under a high magnifying power, the parallelism of the threads composing its margin is distinctly seen, in marked contrast with the ragged projecting ends of an excised portion.

Pupation.—The larvæ made their cocoons between the leaves on which they had fed, or those lying on the surface beneath. In several instances, a half dozen or more were found associated between a couple of leaves, and so firmly attached to one another that they could with difficulty be separated. Of perhaps eighty cocoons obtained, eight only developed the moth during the last of October and early part of November, after a pupation of about two months. None were disclosed in the spring, at the regular time for its apparition during the month of June, as we may infer from the collection of its eggs on the full grown leaves of oak. In a number of the cocoons subsequently opened for examination, were found the shrunken remains of untransformed larvæ, and in others, the apparently fully matured pupa, seen through the thin case, perfect in all but the extension of its wings.

It is worthy of remark that this species, *Hyperchiria Io* and *Hemileuca Maia* have each, in my experiments in rearing them, produced a portion of their brood in the early fall, at a time when their exclusion could not be the result of an indoor temperature, which at that period did not exceed that of their natural exposure.

When in readiness for its final metamorphosis, the pupa forces upward the lid of the cocoon, and withdraws itself through the opening, until only its terminal segments are held by the pressure of the lid and enveloping convergent threads. As the pupa is wholly destitute of the dentiform processes which encircle the pupal segments of those of our moths (Ægeriadæ, Cossidæ et al.), which are known to extrude themselves partially from their cocoons while still in their pupal state, and which apparently are dependent on aid afforded by these processes for their release, some other provision is required by *crispata* to serve in its work of extrication. This is found in the motion permitted its encased limbs while yet a pupa. As a general rule among the Lepidoptera, when the pupa first divests itself of its larval covering, its antennæ-, leg-, and wing-cases are readily separable from the body-case on which they lie, but in a brief time are firmly cemented to it by the drying and hardening of the viscid coating which overspreads it. This species, however, is an exception to the rule, and the first which has been observed by me.* Upon opening its cocoons, the above mentioned organs are found disconnected (except basally) from the pupal body. In its extruded pupa-case may usually be seen the antennæ-cases extended in the form of the antique lyre quite in advance of the other members, the leg-cases brought up from beneath the wing-cases, the latter quite separated at their apices from the abdominal region, and giving indication of having rendered efficient service in the escape from the cocoon.

Pupa.—Its color is essentially that of the contained imago showing through the translucent shell, being ochreous on the thorax and attached members, and lutescent on the abdomen. It is of an oval shape, slightly contracted at the base of the abdomen, its extremities rounded, the terminal segment blunt and without processes. The head-case projects moderately beyond the prothorax; the eye-cases are prominent with a shining mamilla intermediately. The antennæ-cases showing distinctly at their mesial carination the curved tips of the pectinations, extend in the male to the tips of the wing-cases, and in the female to those of the anterior leg-cases. The posterior leg-cases protrude from beneath the wing-cases, nearly across the eighth segment. The wing-cases are rounded at their inner angle, and extend half-way over the seventh segment; under a lens, they show distinctly the crinkled black hairs of the disc of the wing. The thoracic divisions are distinct, not being cemented together; the pronotum is thrice as broad as long, excavated in front, convex behind, depressed medially, its posterior angles subquadrate, with a protuberance near its anterior margin on each side; the mesanotum is one-half longer than broad, its sides subparallel, and its hinder margin rounding over the metanotum to nearly its posterior margin; the metanotum is a little longer than the pronotum, and corrugated longitudinally on each side. The abdominal segments, under a lens, have fine longitudinal wrinkles anteriorly; the incisures are rather deep. The eight abdominal stigmata are visible; the seven anterior ones are broadly oval, with prominent margins, and have a small tubercle behind each; the last one is linear, without a raised margin or accompanying tubercle. Length from five-tenths to six-tenths of an inch; diameter from two-tenths to one-fourth of an inch.

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* In some of the Tineidæ the limbs are partially free.—*Packard, in The American Naturalist*, 1871, vol. v., p. 712.

The larvæ were found very abundantly at Center on the 6th and 20th of August, 1869, feeding on the different species of Quercus, on Vaccinium, on *Pteris aquilina*, and on other plants; they were all, at this time, in their white coats. On the 27th of August, at one locality at Center, on a gently sloping hill-side, a thousand individuals could have been taken by a collector in an hour's time: at this date, a few had assumed the brown coat indicative of their fourth molt, and by the 8th of September, nearly all had undergone this change. At a locality frequently visited, in Bethlehem, near Albany, but one individual was observed during the season, on September 14th.

Notwithstanding the remarkable abundance of the larvæ at Center, the imago has not been observed by me, either in that locality or elsewhere.

During the last of August, 1870, the larvæ were again observed in large numbers at Center, but not so abundantly as in the previous year. Of about twenty collected, nearly all, when in their third and fourth stages, gave out a parasitic larva, which transformed into pupæ, apparently of some species of Tachina, but of which I did not succeed in obtaining an imago. None of my collections of the preceding year were thus affected. Mr. C. V. Riley informs me that his collections of the larvæ, made in 1870, in the vicinity of St. Louis, were also destroyed by probably the same parasite, which he was equally unsuccessful in carrying to maturity.

XI. TRANSFORMATIONS OF HYPERCHIRIA IO (FABR.).

Of the above species, a small company of sixteen larvæ was found at Center, July 15th, arranged side by side in perfect parallelism on a leaf of *Populus tremuloides.* They had evidently, at the time of their collection, undergone their first molt.

Second molt—July 18th ; the leaf on which the larvæ were taken having become dry, they abandoned it and passed to the side of the jar occupied by them, in regular procession and in an unbroken line, moving in single file, unlike *Hemileuca Maia*, whose processions are in files of two's or three's. Later they had arranged themselves in the form of an **S** on the table on which the jar rested, still maintaining their line of march, with the head of one in contact with the terminal legs of the one in advance. A twig of *Populus balsamifera* was given them, which they refused, and ate in preference a fragment of a dried leaf of *P. tremuloides.*

Their cast head-case has none of the spines of the first segment adhering to it, as has that of *H. Maia.** The exuviæ are eaten by the larvæ.

On the 20th, they were one-half inch in length. The head at this stage, is pale red, with the clypeus fuscous, bordered with pale red ; the eyes are on a black patch, surrounded with light red. The body is rufescent, with eight lighter lines : there are six rows of spines, or eight if the inferior row, interrupted on the proleg-bearing segments be included, which have black trunks with white branches ; the lateral spines have their branches terminating in a black bristle ; in the dorsal rows, except on the terminal segments, the branches are without the bristle, and some are black tipped ; those of the substigmatal row are without the branches, having only bristles instead. The legs are marked with fuscous outwardly, and the prolegs are rufescent.

Third molt—From July 25th to 27th. Head fuscous anteriorly, dull green superiorly, as also above the eyes and margining the clypeus. Body white-dotted, and marked with a conspicuous stigmatal orange-red band bordered below with white, a pale rufescent vascular stripe, and two subdorsal and two lateral ones in which are the spines; spines pale green, with the tips or branches black. Legs fuscous; prolegs with a red patch exteriorly.

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* *Twenty-third Report on the N. Y. State Cabinet*, 1872, p. 143.

Fourth molt—Date not noted. Head pale green, black beneath, thence a black line extending upwards, dividing to inclose the eyes; the clypeus marked with black inferiorly and with an abbreviated black line external to it. Body pale green, with a pale yellow subdorsal and lateral line, an orange-red stigmatal line bearing the stigmata centrally, bordering which below is a narrow white stripe; the stripes commence on the third segment. Ventral region ocellated, more conspicuously in two rows of brown dots which range with the prolegs.

Fifth molt—August 10th. The appearance of the larva immediately succeeding this molt was not noted.

Mature larva.—Its length is two inches, and its diameter four-tenths of an inch. Its head is smooth, round, pale green, with a few short white hairs. The body tapers from the seventh segment moderately toward the head, and more considerably posteriorly: color of the body, white dorsally, pale green ventrally, with a yellow green lateral stripe and a quadrangular patch resting thereon on the posterior half of each abdominal segment; beneath this, commencing on the fourth segment, a narrow, sanguineous, stigmatal stripe inclosing the stigmata, having upon it some whitish piliferous dots, and bordered beneath with a narrow white stripe which it overlaps, except on the crown of each segment: ventrally ranging with the bases of the prolegs and on the anterior half of the segment, two rows of triangular sanguineous spots dotted as the stripes; the caudal plates are also sanguineous in continuation of the stigmatal stripes, and the prolegs are marked exteriorly with a similar colored spot. The number of spines on the several segments are, $\frac{1-5}{8}$, $\frac{6-9}{6}$, $\frac{10}{8}$, $\frac{11}{5}$, $\frac{12}{7}$: their trunks are green, of a conical form, with cylindrical green branches which are black tipped; those of the two superior rows are of the same length with the lateral ones, and have their branches contracted suddenly to an acute tip, except on the first segment where the upper branches (black on their superior half or three-fourths) are cylindrical throughout, and have implanted in their summits a bristle nearly or quite as long as the branch; on the second segment, the spines have a few of the bristle-branches, and two or three are also to be seen on the three superior spines of the twelfth segment; the lateral spines have each three or four of these bristle-branches, and the remainder like those of the dorsal rows; in the stigmatal row, the branches are all bristle-pointed, as also in the interrupted substigmatal row: the caudal plates have at their posterior angle, a rudimentary spine.

Pupation.—On the 21st of August, one of the larvæ made its slight cocoon between a couple of leaves. On the 17th of the following month, a male imago emerged from pupa; on the 21st, a second male was disclosed, and some other of the moths emerged during the fall.

The cocoons were kept in a warm room, and some time during the month of January, a crippled imago was found in the box. On the 7th of February, a second crippled specimen was obtained, and on the 10th, a perfect one, small and unusually dark colored.

In the irregularity of its disclosure, and in its extension over the fall and spring months (extending to the latter when not prematurely developed by warmth) this species resembles *Hemileuca Maia.* Its shortest period of pupation as above observed, was less than half that of *Maia*, being but twenty-seven days, and in *Maia* fifty-eight days.*

As an addition to the history of this moth, the following extracts are taken from notes made several years since:

Eggs were deposited July 10th. They are elliptical, somewhat flattened, five-hundredths of an inch in diameter, with a small black spot on each end and a larger orange one on the side. The caterpillars emerged July 22d. They are one-eighth of an inch long, of a reddish color, and have the body covered with long bristles.

On the 27th of July, occurred the first molting, when they measured one-fourth of an inch in length. The head was black, body rufescent, with black branching spines, and several stripes.

The second molt was on August 3d: length one-half inch. The larvæ are still associated in groups while feeding.

At the third molt on August 9th, they had attained a length of seven-eighths of an inch. The black spines have a few of their upper branches black, the others being white as before.

Fourth molt, August 17th: length of larva one inch and one-fourth. The fifth molt, pupation, et cet., were not recorded.

I have taken the larva feeding on locust (*Robinia pseudacacia*), on choke-cherry (*Cerasus virginiana*) on willows and other plants. A colony found on a willow, the leaves of which had become partially dried while being brought to me, deserted the twig for one of choke-cherry standing near it, on which they continued to feed.

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* *Twenty-third Report on the N. Y. State Cabinet*, 1872, p. 148.

In the *Entomological Correspondence* of Harris, clover, elm, oak, and balm of Gilead are given as food-plants of the larva.

I retain for this moth the specific name by which it has long been known, instead of adopting the one proposed for it by Walker (*varia*) and adopted by Packard in his "Synopsis of the Bombycidæ of the United States," in which he remarks that "our species has been confounded by authors with Cramer's species *Io:* judging by Cramer's plate his 'Io' from South America, belongs to a different genus." Dr. Speyer, the eminent German lepidopterist, has critically examined a number of specimens of the moth sent to him, and has found that it was correctly described under the name of *Io*, by Fabricius, in *Syst. Ent.* 1775, p. 560, and its habitat given as North America.

XII. TRANSFORMATIONS OF EACLES IMPERIALIS (DRURY).

A pair of these beautiful and rare moths was taken in Greenbush, *in coitu*, and remained in that state while being brought across the river to Albany. In the box with them were some twigs and leaves of chestnut (*Castanea vesca*), with a number of eggs already deposited on them, from which circumstance, in the absence of any accompanying statement, it is to be presumed that they were captured upon that tree. A large number of eggs were subsequently deposited by the moth, of which, through the kindness of Mr. Louis Sautter, eighty-five were brought to me, which were said to have been laid on the 25th of June.

Eggs.—The eggs are flattened ellipsoids, having their diameters respectively 12-1000ths, 11-1000ths, and 8-1000ths of an inch. When examined under a high magnifying power the shell presents the appearance of having its surface studded with numerous short, capitellate setæ, somewhat curved at the base, and arranged in a degree of regularity at a little more than their length from one another; but as no setæ are seen in relief when looking across the surface of the shell, the forms observed undoubtedly pertain to its structure, and as, from the focal adjustment which their examination requires, they evidently connect the inner and outer surfaces, they can scarcely be anything else than pores traversing the shell. When the eggs were received by me, on the 30th, they all presented a circular depression on their flattened surface, which, in the eggs of many of our moths, indicates a stage in their development. They were of a light honey-yellow, with some reddish spots or clouds maculating their circumference. By the 2d of July, the larvæ could be plainly seen in frequent motion in a few of the eggs, through the transparent shell. On the following day, the larval bands were quite visible.

Young larvæ.—Four of the larvæ were disclosed July 4th, and twelve additional during the five following days; of these the last ones to emerge were quite feeble, four of them dying without partaking of food. None other of the eggs developed, probably from failure in fertilization, resulting from a disturbed coition. The newly emerged larva measures one-fourth of an inch in length. The head is red, round and smooth. Body of a dull red color, armed, except on the last two segments, with six rows of bristle-tipped spines: the subdorsal spines on the second and third segments are nearly one-third the length of the body, black, rugose, bifurcated, each prong tipped with a white acute bristle; on the top of the eleventh segment is a similar spine resting on a red, conical tubercle. The segments are annulated with three fuscous bands terminating laterally at the stigmatal flexure, of which one precedes, and two follow the spines: the terminal segment declines considerably from the plane of the others. Legs, black; prolegs, red.

The larvæ feed only at long intervals, passing most of their time in wandering over the leaves or resting on their petioles.

First molt.—Of one individual on July 11th; on the 12th, of two others, and on the night of the 14th, of four. Length of the larvæ, one-half inch. Head glossy, ferruginous, fuscous at the clypeus and about the eyes. Collar and terminal segment, ferruginous. The segments are testaceous centrally, shading into an obscure red at the incisures, the transverse bands which previously marked them having disappeared. The spines are glossy black with branches tipped with white acute bristles: the two long spines of the second and third segments each and the medial one of the eleventh, which are about one-fifth the length of the body, are directed slightly forward; their two forks are of unequal size; the last mentioned spine is in addition to the six of the preceding segments, and ranges with the four substigmatal and lateral spines, the two subdorsal being placed farther back on the segment: the terminal segment has thirteen spines, viz., six occupying the usual position, a seventh medial one behind the range of the preceding, four on the anal shield, of which the two anterior are the larger (four others are indicated by acute granulations on the posterior margin), and a small one on each terminal leg exteriorly. The stigmata are broadly elliptical, fuscous, and situated on a distinct, elliptical, testaceous spot. Legs and prolegs testaceous, marked outwardly with fuscous.

On the 16th two larvæ were in position for molting, indicating progress in the change by their translucent, vacant head-cases and heads covered by the skin of the first segment.

Second molt—July 17th. Length, six-tenths of an inch. Immediately succeeding the molt the head is pale red, and the long spines before noticed, now appearing as horns, are pearl white.

Three days thereafter, the larva measures eight-tenths of an inch in length. The head is dull ferruginous, with fuscous centrally and laterally. Body of an umber-brown, lighter at the incisures, gray dorsally with a dark vascular line; segments with a few white hairs, the longest of which surround the subdorsal spines; horns of second, third and eleventh segments curved, glossy black, with base luteous; spines dull black. Anal shield marked with a cordiform, glossy black spot, having central and marginal rufescent granulations; anal plates with a subtriangular, granulated, fuscous impression. Stigmata surrounded with a dark brown ring. Legs shining black; prolegs with a black spot exteriorly, and with fuscous near the plantæ.

Third molt—July 30th and August 3d, of the two larvæ surviving this change. Length, one inch. The head and color of the body are as before. A marked feature at this stage is the presence of long white hairs given out from the central portion of the segments, of which the superior ones are nearly twice the length of the thoracic horns, and the lateral ones shorter; similar hairs of medium length project laterally over the proleg-bases. The horns are 18-100ths of an inch long, of a honey-yellow color, and are studded with conical projections (of which the two apical are fuscous), bearing a short, acute, fuscous spinule. The spines of the two subdorsal rows are 5-100ths of an inch long, of the color of the head, and (except the two exterior to the horns) have two fuscous, spinule-tipped projections. The lateral row consists of tubercles, of which those on the interior segments are simple, and on the terminal ones branched, of a darker shade of color than the subdorsal spines. The substigmatal row is composed of still smaller simple tubercles. Anal shield brown with whitish granulations, bordered with tubercles, of which two are branched; anal plates fuscous centrally. Legs ferruginous; prolegs fuscous on the outer side.

Fourth molt of the sole survivor, August 15th. Length, one inch and three-tenths. A marked change occurs in the horns at this molting. From being heretofore cylindrical they are now conical, are armed with stout spinules, and have become shorter; the length of the thoracic ones is 12-100ths of an inch, of the posterior one, one-tenth of an inch. The anal plates are conspicuously marked with whitish granulations. The stigmata are brown, with a central line and border of white, surrounded with fuscous on a subquadrangular testaceous patch.

On the 18th of August the larva died of diarrhœa attended with an extraordinary retroversion and protrusion of the intestinal canal, resulting probably from its having been fed for so long a time on a food-plant unnatural to it. The chestnut leaves which were at first given to the young larvæ were refused. It not being convenient to provide them with buttonwood, on which Harris represents them as occurring, oak, mentioned by Abbot as one of their food-plants at the South, was procured for them, upon which they fed, but at no time in a very earnest manner. An attempt was afterward made to transfer them to pine, on which Dr. Fitch states that they are almost invariably found in the northern States,* but they were unwilling to make the change.

Although the larvæ above described were undoubtedly dwarfed by their spare diet, the small dimensions after the fourth molt, as compared with their mature size (three inches in length), would denote at least one additional molting prior to pupation. This would appear to be established by observations made on larvæ subsequently collected.

During the following month (September, 1869), from the 7th to the 16th, fourteen individuals were taken by me, and as many more by Mr. Meske, of Albany, from the lower branches of a number of pines (*Pinus strobus*) bordering a road in the Forbes manor, at Bath. Their presence on a tree was in most instances readily revealed by the large pellets of their excrement lying upon the smooth graveled road beneath, when, from the robust form of the larva in marked contrast with the slender leaves surrounding it, its resting-place was not difficult to detect. On the 7th, one was taken which had just completed its last molting; on the 9th one was observed in the process of molting, which, from some irregularity attending it, had fallen to the ground; and on the same day one which had already assumed the brown or tawny hue indicative of its full maturity was taken while moving down the trunk of a tree to seek its place for pupation. The most advanced one of the others collected, matured on the 11th, and transformed to a pupa on the surface of the ground on the 16th. Most of the remainder entered the ground, where they constructed cells of moderate dimensions for their pupal transformation.

The pupæ were kept in a cold room during the winter. About the 1st of March they were removed to a warm apartment. April 28th, May 3d and 7th, male imagines emerged, after which females were disclosed until near the end of the month.

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* *Third, Fourth and Fifth Reports on the Insects of New York*, 1859, Section 271.

In the fall of 1870 diligent search was made for the larva in the locality at Bath, where it had been abundant the preceding year, as above recorded, without finding a single individual. Its non-occurrence indicates a marked periodicity in the appearance of the species or, possibly, an exhausted locality from the collections made.

A single specimen of the closely related species *Citheronia regalis* Hübner, has been taken near Albany, by Mr. Sautter, and I am informed by Dr. M. Cooke, of Utica, N. Y., that its larva has been found, on one occasion, in the vicinity of that city. I have not met with it in my field collections.

XIII. LARVAL NOTES ON ANISOTA SENATORIA (SMITH).

Moths were observed at Center, N. Y., July 7th, depositing their eggs on the under surface of leaves of oak, in regular distribution in a single layer, and in contact with one another. A leaf of *Quercus prinoides* of ordinary size was collected, having one-half of its surface covered with the eggs. From a count of a portion of the deposit, the whole number was estimated at five hundred; still larger patches have been observed. From the number usually occurring in these deposits it may be presumed that the moth places all her eggs on a single leaf unless disturbed during the operation.

The eggs hatched July 11th. The head of the young larva is oval and glossy black. The body is pale yellow-green, with a few short hairs; on the second segment are two smooth, straight, subcylindrical, black horns, arising from a green base, and with a slight enlargement at the apex, where they give out two black diverging setæ of the length of two-thirds that of the horn.

The young larvæ feed in company, and occupy both surfaces of the leaf, the entire substance of which they consume, except the veins and veinlets, leaving frequently a very good skeleton of the leaf.

The *first molting* occurred on the 18th and 19th of July. At this stage the body is obscure green with seven fuscous lines, of which the dorsal and stigmatal ones are narrow; the subdorsal and lateral ones broader, having in them a row of short spines. Collar centrally and anal segment, shining black. Legs, black; prolegs, with a black spot outwardly.

Second molt—July 28th and 29th. Length of larva, 37-100ths of an inch. Head and collar, glossy black. Horns, slightly spinose, enlarged at the tip, and usually with apical spines. The abdominal stripes are black, with yellow-brown intermediately, showing a broad stigmatal stripe. The terminal segment is spinose, and of a glossy black.

Third molt—August 4th and 5th. Length, six-tenths of an inch. The larva is glossy black, with eight yellow stripes, of which the lower one is geminated by a crescent on the central portion of each segment inclosing a spinule; ventrally from the fifth segment is a yellow-green interrupted stripe. The horns are slightly tapering, clubbed at their tips, and two-tenths of an inch long. The legs and prolegs are black.

Fourth molt.—Extending from August 14th to 16th. Immediately following the molting, the head, collar, horns, anal shield, anal plates and legs are flavescent; in a few hours they become shining black. The horns are but slightly enlarged at the tip, being less so than previous to this molt. The body is covered with numerous, minute, shining, elevated points of the color of the ground upon which they are placed.

The mature larva is so fully and accurately described by Dr. Fitch* as not to need redescription here.

Subsequent collections of larvæ were made and inadvertently added to the above, preventing the observation of the date of pupation of the brood. The pupation of the last occurred about the 15th of September. Larvæ were still observed in the field on the 30th of September.

Dr. Eights, of Albany, has informed me that a number of years ago he observed on the line of the New York Central railroad, between Albany and Schenectady, a species of caterpillar so exceedingly abundant on and about the railroad track that the numbers crushed on the rails by the passage of the trains caused the slipping of the wheels of the engines to the extent of proving a serious inconvenience in ascending grades. A notice of the interesting incident was communicated by him to one of the journals of the day, in which some account of the caterpillar was given. Although from the long time which has elapsed since the event he is not able to indicate positively the species, he believes it to have been *A. senatoria*, and the locality of its occurrence in the vicinity of Center.

This larva is found annually at Center in great abundance. In the more favorable years for its multiplication, it abounds so excessively that the smaller oaks, although very numerous there, are almost as effectually defoliated as if a fire had swept over them. I have no information of its occurrence in equal numbers at any other locality.

The congeners of this species, *pellucida*, *stigma*, and *rubicunda*, are rarely taken in the neighborhood of Albany. Of the latter species the larva has not been observed, but a wing of the imago has been found, by Mr. Meske, at Center.

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* *Third, Fourth, and Fifth Reports on the Insects of N. Y.*, 1859, section 322.

XIV. CALENDAR OF BUTTERFLIES FOR THE YEAR 1870.

In the following table is contained a record of seventy-three species of Rhopalocera observed at six localities in the State of New York on thirty-five days during the spring and summer of 1870, commencing with the 26th of April, the date of the first observed apparition of *Thecla Irus*, and ending on September 22d.

The figures immediately below the several months give the day of collection or observation. Underneath these the locality is indicated in roman characters, I representing Schoharie; IV, Center; V, Bethlehem; VII, Bath; Sharon Springs designated by the letter A; and Glen, in Warren county, by B. In a few instances where the apparition of fresh individuals of a new brood was noted, the date is indicated by the insertion of a larger star (*).

The greatest number of species observed in one day was twenty-nine, at Center, on the 16th of June. The time of observation was usually between the hours of 10 A. M. and 2 P. M.

The last column but partially represents the comparative abundance of the several species, its more direct import being the continuance of the brood or a succession of broods. Thus, while *C. Philodice* is recorded on twenty-eight occasions, *L. comyntas* on twenty-two, *C. Americana* on nineteen, *P. Troilus* on sixteen, *L. misippus* on fifteen, *M. tharos* on thirteen (each of these being double or triple brooded), of none of them were as many individuals seen as of *Thecla Irus*, which was observed on but eight occasions. If from this comparison *C. Philodice* be omitted, the number of *T. Irus* observed was at least three times as great as of any other of the species.

The single observations recorded of several of the species, viz., *A. Atlantis*, *A. Idalia*, *M. Harrisii*, *G. Dryas*, *P. cardui*, *P. Atalanta*, *H. Sassacus* and *H. Leonardus*, faithfully indicate their rarity during this year at least, for of each of these but a single individual was collected or recognized.

The observations at Sharon Springs are by Mr. O. Meske, as are also many of those at Bath, Bethlehem and Center.

	April.	May.									June.					July.											August.			September.						Times observed.
	26	3	4	6	14	16	21	22	25	31	5	7	16	22	29	2	4	6	9	10	13	16	21	24	28	30	7	26	31	2	6	9	14	19	22	
	IV	IV	VII	IV	IV	V	IV	VII	IV	IV	V	IV	IV	V	IV	IV	A	V	IV	A	IV	IV	IV	I	V	IV	B	V	IV	VII	VII	V	V	IV	VII	
Papilio Turnus *Linn*	.	.	.	.	.	.	.	.	*	*	.	*	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9
Papilio Troilus *Linn*	.	.	.	.	.	.	.	.	.	*	.	*	*	*	*	*	.	*	*	.	.	*	*	.	*	*	.	*	*	.	.	*	*	.	.	16
Papilio Asterias *Fabr*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	*	.	.	.	.	.	.	*	*	.	.	4
Pieris oleracea (*Harris*)	.	*	.	*	.	*	.	.	.	.	.	.	.	*	*	*	.	.	.	.	.	.	.	*	*	*	.	.	.	.	.	.	.	.	.	9
Pieris rapæ (*Linn.*)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	*	*	*	*	*	*	*	*	9
Colias Philodice *Godt*	.	.	*	.	.	*	.	.	*	*	.	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	28
Danais Plexippus (*Linn.*)	.	.	.	.	.	.	.	.	.	*	.	*	.	.	.	.	.	*	.	.	.		.	.	*	*	*	*	*	*	*	*	*	.	.	12
Argynnis Aphrodite *Fabr*	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.		*	*	*	.	.	*	*	*	*	*	.	*	.	.	.	*	*	.	.	12
Argynnis Cybele *Fabr*	.	.	.	.	.	.	.	.	.	.	.	.	.	*	*	*	.	*	*	.	*	*	*	.	*	*	.	.	.	.	.	*	*	.	.	12
Argynnis Atlantis *Edw*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	.	.	.	.	.	1
Argynnis Idalia *Fabr*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	1
Argynnis Bellona *Fabr*	.	.	*	.	.	*	.	*	.	.	.	.	.	*	.	*	.	*	.	.	.	.	.	.	*	.	.	*	.	.	.	*	*	.	.	10
Argynnis Myrina *Fabr*	.	.	.	.	.	.	.	.	.	.	.	.	*	*	.	*	.	*	.	.	.	.	.	.	*	*	.	*	*	.	.	*	*	.	.	10
Melitæa tharos *Boisd. et Lec.*	.	.	.	.	.	.	.	*	.	*	.	.	*	.	.	*	.	.	.	.	.	.	.	.	*	*	.	*	*	*	*	*	*	.	*	13
Melitæa Marcia *Edw*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	*	*	.	*	.	*	*	*	.	.	.	.	.	.	.	.	*	.	.	.	8
Melitæa Harrisii *Scudd*	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Melitæa Batesii *Reak*	.	.	.	.	.	.	.	.	.	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
Melitæa Nycteis *Doubl*	.	.	.	.	.	.	.	.	.	.	.	.	*	.	*	*	.	.	*	.	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	7
Melitæa Phaeton *Fabr*	.	.	.	.	.	.	.	.	.	.	.	.	*	.	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
Grapta comma (*Harris*)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	*	2

Grapta Dryas *Edw*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	.	1
Grapta Progne (*Cram.*)	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	.	.	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	.	2
Grapta J-album (*Boisd. et Lec.*)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Vanessa Antiopa (*Linn.*)	.	.	.	.	.	*	.	.	.	*	.	.	.	.	*	*	.	*	*	.	*	*	.	.	.	.	.	.	*	*	*	.	.	.	.	11
Pyrameis huntera (*Fabr.*)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	*	.	.	2
Pyrameis cardui (*Linn.*)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Pyrameis Atalanta (*Linn.*)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	1
Limenitis misippus (*Fabr.*)	.	.	.	.	.	.	.	.	.	*	.	.	*	.	*	*	.	.	.	.	*	*	*	*	*	*	.	*	*	.	*	.	*	*	.	15
Limenitis arthemis (*Drury*)	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Limenitis Ursulā (*Fabr.*)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	*	.	.	.	.	.	.	.	.	*	.	.	.	*	.	.	.	4
Satyrus Alope (*Fabr.*)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	*	*	.	.	.	*	*	.	.	.	.	.	.	.	.	.	5
Satyrus Nephele (*Kirby*)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	*	.	.	.	*	*	.	.	.	.	.	.	.	.	.	.	4
Neonympha Eurytus (*Fabr.*)[1]	.	.	.	.	.	.	.	.	.	.	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Neonympha Canthus (*Linn.*)[1]	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Thecla Irus (*Godt.*)[2]	*	*	.	*	*	.	*	.	*	*	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8
Thecla Augustus *Kirby*	.	*	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Thecla niphon *Hubn*	.	*	.	*	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
Thecla Melinus *Westw*	.	*	.	*	.	.	.	.	.	*	.	.	.	.	*	*	.	.	*	.	*	*	.	.	.	*	.	.	*	.	.	.	*	.	.	11
Thecla Calanus (*Hubn.*)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Thecla liparops *Boisd. et Lec.*[3]	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	*	.	.	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	3
Thecla Edwardsii *Saund*	.	.	.	.	.	.	.	.	.	.	.	.	.	*	*	*	.	*	*	.	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	8
Thecla Acadica *Edw*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	*	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
Thecla Mopsus (*Hubn.*)	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	.	*	.	*	*	*	.	.	*	.	.	.	.	.	.	.	.	.	6
Lycæna violacea *Edw*	.	*	*	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
Lycæna neglecta *Edw*	.	.	.	.	*	*	*	.	*	*	.	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7
Lycæna comyntas (*Godt.*)	.	.	.	*	*	.	*	*	*	.	.	.	.	*	*	*	.	*	*	.	*	*	*	.	*	*	*	*	*	.	*	*	*	*	.	22

	April.	May.									June.					July.											August.			September.						Times observed.
	26	3	4	6	14	16	21	22	25	31	5	7	16	22	29	2	4	6	9	10	13	16	21	24	28	30	7	26	31	2	6	9	14	19	22	
	IV	IV	VII	IV	IV	V	IV	VII	IV	IV	V	IV	IV	V	IV	IV	A	V	IV	A	IV	IV	IV	I	V	IV	B	V	IV	VII	VII	V	V	IV	VII	
Lycæna Scudderii *Edw.*	.	.	.	.	.	.	.	.	*	*	.	*	*	.	*	*	.	.	*	.	*	*	*	.	.	*	.	.	.	.	.	.	.	.	.	11
Chrysophanus Americana (*Harris*)	.	.	.	.	.	.	*	.	.	*	.	*	*	.	.	.	.	*	*	.	*	*	*	.	*	*	*	*	*	*	.	*	*	*	*	19
Chrysophanus Hyllus (*Cram.*)[4]	.	.	.	.	.	.	.	.	.	.	.	.	*	*	.	*	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	5
Eudamus Pylades *Scudd.*	.	.	.	.	.	.	.	.	.	.	.	*	*	*	*	*	.	*	*	.	*	.	*	.	.	.	.	.	.	.	.	.	*	.	.	10
Eudamus Tityrus (*Fabr.*)	.	.	.	.	.	.	.	.	.	*	.	*	*	*	*	*	.	*	*	.	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	9
Nisoniades Juvenalis (*Fabr.*)	.	.	.	*	*	.	*	*	*	*	.	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8
Nisoniades Persius *Scudd.*	.	*	.	*	*	.	*	*	*	*	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8
Nisoniades Martialis *Scudd.*	.	.	.	.	*	.	*	.	*	*	.	*	*	*	.	.	.	.	*	.	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	10
Nisoniades Lucilius *Lintn.*	.	.	.	.	.	*	*	.	*	.	.	.	.	.	.	.	.	*	.	.	.	.	.	.	*	.	.	*	.	.	.	*	*	.	.	8
Nisoniades Icelus *Lintn.*	.	.	.	.	.	.	.	.	*	*	.	*	*	.	.	.	.		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
Hesperia Metea *Scudd.*	.	.	.	.	*	.	*	.	*	*	.	.	*	.	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6
Hesperia vialis *Edw.*	.	.	.	.	.	.	*	.	*	*	.	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5
Hesperia Zabulon (*Boisd. et Lec.*)[5]	.	.	.	.	.	.	.	*	*	*	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6
Hesperia Hianna *Scudd.*	.	.	.	.	.	.	.	.	*	*	.	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
Hesperia Sassacus *Harris*	.	.	.	.	.	.		.	.	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Hesperia Peckius *Kirby*[6]	.	.	.	.	.	.	.	.	.	.	*	.	*	*	.	*	*	*	.	.	.	.	.	.	*	*	.	*	.	.	.	*	*	.	*	12
Hesperia Mystic *Edw.*	.	.	.	.	.	.	.	.	.	.	*	.	*	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	.	.	*	*	.	.	.	5
Hesperia Taumas (*Fabr.*)[7]	.	.	.	.	.	.	.	.	.	.	*	.	*	*	.	.	.	*	.	.	.	.	.	.	.	.	.	*	.	.	.	*	*	*	.	8
Hesperia bimacula *Grote-Rob.*[8]	.	.	.	.	.	.	.	.	.	.	.	.	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Hesperia Metacomet *Harris*	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	*	.	.	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	3

Hesperia Ætna *Boisd.*[9]	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	*	.	*	*	*	.	.	.	.	*	.	.	.	.	.	.	.	.	.	.	6
Hesperia verna (*Edw.*)	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	*	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
Hesperia Manataaqua *Scudd*	.	.	.	.	.	.	.	.	.	.	.	.	.	*	*	.	.	.	*	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	4
Hesperia Logan *Edw.*[10]	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	*	.	.	*	.	*	*	.	.	.	.	.	.	.	.	.	.	.	.	.	5
Hesperia Massasoit *Scudd.*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	*	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Hesperia Leonardus *Harris*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	*	.	.	.	.	.	.	1
Thymelicus Numitor (*Fabr.*)[11]	.	.	.	.	.	.	.	.	.	.	*		*	*	.	.	.	.	.	.	.	.	.	.	*	.	.	*	*	.	.	*	*	.	.	8
Number of species observed	1	7	3	8	8	7	10	6	15	22	8	19	29	24	20	26	7	27	22	7	18	18	13	9	22	16	6	16	13	6	8	22	22	6	6	

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[1] *Hipparchia Boisduvalii* Harris.
[2] *Thecla Arsace* Boisd. et Lec.
[3] *Thecla strigosa* Harris.
[4] *Polyommatus Thoe* Boisd. et Lec.
[5] *Hesperia Hobomok* Harris = *H. Pocahontas* Scudd., *H. Quadaquina* Scudd.
[6] *Hesperia Wamsutta* Harris.
[7] *Hesperia Ahaton* Harris.
[8] *Hesperia Acanootus* Scudd.
[9] *Hesperia Egeremet* Scudd.
[10] *Hesperia Delaware* Edw.
[11] *Heteropterus marginatus* Harris.

The following are some notes made during the year 1870 on the abundance, condition, time of appearance of sexes, successive broods, larvæ, et cet., of some of the species recorded in the preceding list:

May 3d.—*Thecla Irus* of each sex abundant at Center. Of *T. Augustus*, eight individuals were collected; of *T. niphon*, five, and of *T. Melinus*, one. Of the Nisoniades, a few of *Persius* only were observed. *Pieris oleracea* was taken by me, for the first time in Albany county.

May 14th.—*Thecla Irus*, with each sex in good condition, still abroad at Center; the only Thecla observed. A few females of *N. Persius* were taken for the first time this season, and one of *N. Juvenalis;* of *N. Martialis*, two males. Of the earliest Hesperian, *Metea*, two males were obtained.

May 16th.—Five males of *Nisoniades Lucilius* were captured while hovering over blossoms of *Aquilegia Canadensis*, and as many more were observed. *Argynnis Bellona* was abundant in wet meadows. Five of *Thecla niphon* were taken, all of which were females; the larger number of the captures of this species prove to be of this sex. Bethlehem.

May 19th.—*Pieris oleracea* about gardens, in woods and its margins in meadows. *N. Lucilius* taken. Schoharie.

May 21st.—*N. Persius* abundant, and many quite fresh, with a few only of *N. Juvenalis* and *Martialis.* A female *N. Lucilius* which had just emerged from the chrysalis was taken while sitting on a twig. Among numerous *Lycæna neglecta* no females were seen, and of *L. comyntas* but a single female. The abundant brood of *T. Irus* was represented by only a few worn specimens. Two males of *Hesperia vialis* were collected and several of *H. Metea.* A female *Chrysophanus Americana* was taken, indicating the species to have been abroad for several days. Center.

May 25th.—Of the Nisoniades, *Juvenalis* and *Icelus* were abundant, *Martialis* and *Lucilius* quite few in number. Several of each sex of *Hesperia Hianna* were obtained, and one *H. Zabulon.* Of *Lycæna Scudderii* — its first observation for the season — a single one only was seen. One female of *L. neglecta* occurred. Center.

May 28th.—At Schoharie, a few *P. oleracea* were seen, the first brood having nearly disappeared. Its eggs and some young larvæ were found on horse-radish. On June 12th none of the butterflies could be seen.

May 31st.—*L. neglecta* abounded in flocks; *L. Scudderii* was not rare. Of *Hesperia Hianna* twenty captures were made, and more could have been secured. Center.

June 7th.—Collected twelve *Melitæa Batesii*, one of which was a female. Females of *L. Scudderii* have appeared.

June 16th.—*Melitæa Batesii* were abundant; of *M. Nycteis*, only a few were observed. Of *Hesperia bimacula*, seven males and one female were collected; of *Chrysophanus Hyllus*, three, and of *Melitæa Phaeton*, six.

June 29th.—Melitæas very abundant at Center; of *M. Nycteis*, only males occurred. No Nisoniades were seen.

July 2d.—Females of *M. Nycteis* were abundant.

July 6th.—At Bethlehem, males of *Argynnis Aphrodite* and of *A. Cybele* abundant. In a number of captures of these species, no females occurred. *Satyrus Alope* abundant.

July 9th.—At Center, the second brood of *Lycæna Scudderii* very abundant in the roads, on flowers and on leaves; threw the net over fifteen individuals at once. On a small patch of damp ground in the road a large number had assembled, estimated at two hundred. Several Theclas were taken while resting on the flowers of *Ceanothus Americanus* (Jersey tea). Six of *Hesperia Logan* were captured, all of which were males.

July 13th.—*L. Scudderii* quite abundant, and among them many females. *Limenitis misippus* was more numerous than ever before observed by me. Individuals of a second brood of *Nisoniades Martialis* were taken which show some difference of color from those of the first brood; they were at first believed to be a distinct species. Center.

July 17th.—The second brood of *Pieris oleracea* which has been numerous for a time past, has disappeared, only one individual having been observed. Schoharie.

July 20th.—A larva of *Danais Plexippus* changed to a chrysalis, from which it emerged on the 28th.

July 21st.—Larva of *Papilio Troilus* found on sassafras, and two of *P. Turnus* on wild-cherry, resting each on a web spun over the upper surface of a leaf, drawing the sides somewhat together and depressing the midvein a little distance beneath the web. *Limenitis misippus* abundant; *Lycæna Scudderii* diminishing; a few good *Thecla Mopsus* still abroad; *T. Edwardsii* quite worn; all the other species of diurnals observed were worn except *C. Americana*, of which there are successive broods throughout the season.

July 24th.—*Pieris rapæ* was recognized, for the first time, in Albany. A few were seen flying about piles of cabbages exposed upon the sidewalk at some vegetable stands in the south part of the city, and in one instance alighting upon a cabbage as if to deposit an egg. On the 27th many were seen and several were captured in a vegetable garden at the extreme southern part of the city, near "the Island," upon which cabbages are extensively cultivated. Upon visiting the island, they were found to be so abundant that several could be observed at any moment hovering over or alighting on the plants. Many were attracted by the blossoms of *Lappa officinalis* (burdock) growing abundantly upon the bank of Island creek; on one plant ten were counted, intent on taking their food from the flowers. Of the thirty individuals collected, two-thirds were males which were nearly all in good condition, while the females were worn. This butterfly is more difficult to capture on the wing than *oleracea*, for while the flight is not more rapid than of that species, it is undoubtedly more erratic, for less than one-third of my attempts to inclose them in the net were successful.

July 25th.—No *P. oleracea* were observed at Schoharie, but some full-grown larvæ were collected from horse-radish, and a few of its chrysalides were found.

July 28th.—A large number of larvæ of *Nisoniades Lucilius* were found resting concealed on the under surface of leaves of *Aquilegia Canadensis*, growing abundantly in an elevated rocky locality in Bethlehem. Their shelter, as observed in numerous specimens collected at this time and in larvæ subsequently taken, is constructed in a very ingenious manner. Shortly after the larva leaves its shell, and with its first feeding it commences to cut a narrow channel in the leaf from the margin inwardly a short distance; this completed, from another point on the margin not far removed from the first, a second channel is cut, curving toward the former, the two not uniting, but frequently running parallel for a short space. The portion thus nearly separated retains its connexion with the leaf by only a pedicel-like attachment. Its own weight carries it downward to nearly the position which it is to assume, when a very slight effort by the young larva serves to bring it to its desired place, almost in contact with the lower side of the leaf, to which it is then fastened by threads passing between the two surfaces at several points. Sometimes, as if with the object of economizing time or labor, the lobe of a leaf is selected of which to construct this shelter, when but a moderate amount of cutting at its base gives the requisite size and desired form.

Resting upon the inside of this recurved portion, the larva may always be found, except during the brief time that it leaves its concealment to take its food from some neighboring leaf. Its rapid feeding soon satisfies its appetite, when it moves quickly back and resumes its position. In localities where the larva occurs, these hiding-places may be readily found by bending over the stems of the Aquilegia, when these little bits of the bright green upper surface of the leaf, in marked contrast with the grayish-green of the lower side upon which they rest, at once disclose their presence. Should one of them be found deserted, its former occupant may perhaps be discovered on a leaf near by, within a larger retreat of similar construction. From the gradation of sizes observed, it is probable that following each molting a new shelter is constructed, of a size sufficient to cover the larva during that stage of growth, until at the last larval molting, when an entire leaf is simply folded over, or two or more leaves have to be brought together in order to afford the necessary concealment.

Some of the larvæ taken at this time had undergone their third molt, many their second, and the larger number their first. About one hundred were collected, and two eggs near their development.

Fresh broods of *Argynnis Myrina* and *A. Bellona* were observed on mint blossoms; also many *Hesperia Peckius*, *Limenitis misippus* and *Thymelicus Numitor*. Bethlehem.

July 30th.—*Limenitis misippus* abundant and easily captured. A few *Hesperia Peckius* seen. Some *Lycæna comyntas* in good condition, but *L. Scudderii* quite worn. A few *Thecla Mopsus*, a little worn, on blossoms of Jersey tea. Some *P. oleracea*, but no *P. rapæ* observed. Center.

July 31st.—The third brood of *P. oleracea* quite abundant at Schoharie.

August 6th.—At Saratoga Springs, saw a number of *Pieris rapæ* in company with *P. oleracea*, flying about gardens and blossoms of burdock in vacant lots.

August 8th.—At the Glen, Warren county, *Pieris rapæ* was numerous, and its larvæ were found on garden cabbages, usually feeding on the tender central leaves of the plant, unlike *oleracea*, which more frequently occur on the older outer leaves. On a small central leaf of a plant commencing to form a head, three larvæ were feeding, the ravages of which, in their progress to maturity, in all probability would have prevented the heading of the plant. Of several of the plants the central leaves had been nearly consumed, and an amount of excrementitious matter was distributed about their stalks by larvæ which had matured and probably transformed to the butterflies which were then flitting about the garden. A rapæ chrysalis was observed, attached to the midrib of one of the larger leaves. Between Saratoga and the Glen several of *Danais Plexippus* were seen in graceful flight. At the Glen, *Colias Philodice* occurred in companies, upon damp patches of ground. *Argynnis Cybele* and *A. Atlantis* were captured on the flowers of Canada thistle. *Chrysophanus Americana* was very abundant. A single *Lycæna comyntas* was seen, and a Grapta in flight, of which the species could not be determined.

August 15th.—At Schoharie, *P. oleracea* of the third brood, more abundant than at any time previously this year.

Two colonies of *Vanessa Milbertii* larvæ were taken on nettle (*Urtica dioica*), the one apparently after the first molting, and the other after the third. The larvæ of the former were feeding in company near the tip of a stem, and on one of the terminal leaves was a cluster of the egg-shells from which they had emerged.

August 18th.—Fourteen larvæ of *Pieris rapæ* were collected, all of which had transformed to chrysalides by the 21st; the last imago from these emerged on the 30th.

August 22d.—Larvæ of *Pyrameis Atalanta* abundant within folded leaves of the nettle; some of the larvæ were nearly mature, and others about half-grown.

August 26th.—A few young larvæ of *Limenitis misippus* were found on poplar and willow. One on the willow had, at this early period, commenced the construction of its hybernaculum, and another had built its peculiar structure of bits of leaf on the mid-vein.

Collected ten *Nisoniades Lucilius* of the third (?) brood, most of which were males. A few of the larvæ, nearly full-grown were found within their leaf shelters on the Aquilegia, but none of the chrysalides or their cases could be discovered, although careful search was made for them.

Hesperia Peckius, *Argynnis Bellona* and *A. Myrina*, were abundant on mint. *Danais Plexippus* was more numerous than I had ever seen it.

August 29th.—The third brood of *P. oleracea* is nearly gone. As near as can be determined from visits regularly made to Schoharie, at intervals of a week, the three broods of the above species have had, during the present year, a continuance of about a month each, the last brood probably continuing for a few days longer. Approximate periods of their duration would be, of the first brood, from May 5th to June 5th; second brood, from June 20th to July 20th; third brood, from July 28th to September 1st.

Nisoniades Lucilius emerged after thirteen days in the chrysalis state. The larva had been reared in confinement, and was transformed to a chrysalis among the leaves of its food-plant.

August 31st.—Eight males of the hitherto rare *Hesperia Leonardus* were collected on the summit of a hill at Center, indicating it to be partial to elevated ground. Several *L. comyntas* of a new brood were taken, and also fresh specimens of *Vanessa Antiopa.*

September 9th.—At Bethlehem collected several males of *Nisoniades Lucilius*, with some of its larvæ just from the egg, and others half-grown. *Argynnis Myrina* were observed *in copula.* Of *Hesperia Taumas*, usually rare, six males and one female were collected.

September 14th.—*Argynnis Idalia* was taken for the first time in the vicinity of Albany. Young larvæ of *L. misippus* and *N. Lucilius* were observed. Bethlehem.

October 21st.—On "the Island" collected numbers of the chrysalides of *P. rapæ* which were attached to the under surface of the stems of the coarser weeds lying on the ground. Several were taken from the lower side of prostrate pieces of timber. None were found upon the trunks of trees or standing weeds, nor on fences, except at one place where tomato vines had grown over the lower board, affording a partial protection. A few larvæ were found suspended, and nearly ready for transformation, and a few were still remaining on the plants.

From a portion of the above collection of chrysalides placed in a box, there were obtained during the winter ten male and thirteen female imagines.

XV. DATES OF COLLECTION OF SOME HETEROCERA FOR 1870.

SPHINGIDÆ.

Sesia diffinis *Harris*	May 21.
Sesia gracilis *Gr.-Rob*	May 25.
Sesia Buffaloensis *Gr.-Rob.*, larva	Aug. 22.
Philampelus Pandorus (*Hübner*)=*P. Satellitia* Harris	June 21.
Philampelus achemon (*Drury*)	June 23.
Smerinthus geminatus *Say*	June 4.
Ceratomia Amyntor (*Hübner*)=*C. quadricornis* Harris	June 19.
Macrosila quinquemaculata (*Haworth*)	June 24, Sept. 26.
Sphinx chersis (*Hübner*)=*S. cinerea* Harris	June 5, June 24.
Sphinx drupiferarum *Sm.-Abb*	June 11, June 24.
Sphinx kalmiæ *Sm.-Abb*	June 24.
Sphinx gordius *Cramer*	May 19, June 24.

BOMBYCIDÆ.

Eudryas grata (*Fabr.*)	July 6.
Eudryas unio (*Hübn.*)	July 6.
Scepsis fulvicollis (*Hübn.*)	Sept. 9.
Ctenucha virginica (*Charp.*)	June 6.
Spilosoma virginica (*Fabr.*)	April 27, May 21.
Hyphantria textor *Harris*	May 25.
Ecpantheria scribonia (*Hübner*), larva	Aug. 15.
Ecpantheria scribonia, ex larva	Nov. 9.
Lagoa crispata *Packard*	June 16.
Empretia stimulea *Clemens*, larva	Aug. 30.
Limacodes scapha (*Harris*), larva	Sept. 16.
Perophora Melsheimerii *Harris*	June 7.
Cerura borealis *Harris*, larva	Aug. 26.
Hemileuca Maia (*Drury*)	Sept. 19.
Eacles imperialis (*Drury*), larva	Sept. 2.
Anisota stigma (*Sm.-Abb.*), larva	Sept. 9.
Anisota senatoria (*Sm.-Abb.*)	June 16.
Clisiocampa decipiens *Walk*	July 17.
Lithædia bellicula	May 16.

NOCTUIDÆ.

Leucania unipuncta *Haw*	Sept. 9.
Gortyna nitela *Guen*	Sept. 5.
Hydrœcia sera *Gr.-Rob*	July 22.
Achatodes sandix *Guen*	July 25.
Prodenia autumnalis *Riley*	Sept. 28.
Cirrœdia pampina *Guen*	Sept. 14.
Phlogophora anodonta *Guen*	July 18.
Euplexia lucipira (*Linn*)	June 8.
Aplecta latex *Guen*	May 15.
Hadena subjuncta *Gr.-Rob*	June 1.
Hadena chenopodii (*Albin*)	July 22.
Xylina Bethunei *Gr.-Rob*	Sept. 18.
Cucullia florea *Guen*	July 8.
Cucullia intermedia *Speyer*	May 28.
Rhodophora florida *Guen*	July 27.
Abrostola urentis *Guen*	July 12.
Plusia simplex *Guen*	Sept. 14.
Amphipyra pyramidoides (*Linn.*)	July 25.
Catocala Clintonii *Grote*	July 10.
Catocala cerogama *Guen*	July 22.
Catocala relicta *Walk*	July 25.
Catocala cara *Guen*	Aug. 22.
Catocala parta *Guen*	Sept. 6.
Catocala amatrix *Hübn*	Sept. 22.
Drasteria erechtea (*Cram.*)	May 16, Sept. 9.
Drasteria erechtea (*Cram.*), larva	Oct. 21.
Euclidea cuspidea *Hübn*	May 21.
Poaphila quadrifilaris (*Hübn.*)	May 21, June 7.

PHALÆNIDÆ.

Eutrapela transversata (*Drury*)	July 27.
Angerona crocataria (*Fabr.*)	June 9.
Endropia ferruginaria *Pack.* MS	June 7.
Tetracis lorata *Grote*	May 31.
Cleora pulchraria *Minot*	Sept. 6.
Boarmia sublunaria *Guen*	May 15.
Corycia semiclarata ? *Walk*	May 31.
Lozogramma petraria *Hübn*	June 15.

Numeria obfirmaria *Hübn.*	May 21.
Fidonia bicoloraria *Minot.*	May 25.
Hæmatopis grataria (*Fabr.*).	May 25.
Aspilates dissimilaria *Hübn.*	June 29.
Crochiphora accessaria *Hübn.*	May 25.
Zerene catenaria (*Cram.*).	Sept. 19.

ASCENT OF MT. SEWARD AND ITS BAROMETRICAL MEASUREMENT.

SAMUEL B. WOOLWORTH, LL.D.,
Secretary of the Board of Regents of the State of New York:

DEAR SIR.—I herewith respectfully submit to you the report of my recent explorations in the Adirondack wilderness of Northern New York.

The main object of the expedition was the barometric measurement of Mt. Seward, a lofty peak, of the ascent of which there is no record, and the height of which remained in doubt. Prof. Emmons, while engaged in the survey of the second geological district of the State, estimated the elevation at 5,100 feet above tide; but as he neither ascended the mountain, nor attempted its measurement by triangulation, there seems to have been no basis for such a conjecture.

Mt. Seward—called by the Mohawk Indians *Ou-kor-lah*, or the "big-eye"—is nearly upon the most southern boundary of the county of Franklin, in Great tract No. 1, township twenty-seven of Macomb's purchase; north latitude about 44° 10′, and longitude, west from Greenwich, 74° 0′. It is, with the numerous lesser peaks connected with it, the most westwardly of the Adirondack, hyperite group. East from it is Wallface mountain of the Indian Pass, and more distant, Mt. Tahawus or Marcy, the summit of the range and of the State, raising its gray peak 5,467 feet above the sea. South of Mt. Seward are the Preston ponds and their outlet, Cold river, which empties into the Raquette just below Long lake. The Raquette river might, perhaps, be called its western boundary; its northern limit, but for Moose mountain and Ampersand pond, would be the well-known Saranac lakes.*

In this expedition my route was from Albany, via Saratoga up the Hudson, and to Indian lake in Hamilton county; thence crossing the woods to the beautiful and deservedly famous Blue Mountain lakes. Here guide and canoe awaited me, and, after tarrying to make the ascent of Blue mountain (Mt. Emmons), I passed over the lakes, and, by way of Marion river, reached Lake Raquette. It may be here remarked that the whole distance, from Blue mountain to the foot of Mt. Seward, might almost be made without leaving the canoe or boat; lakes and rivers, for some fifty or sixty miles, forming the tortuous highway.

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* In the accompanying plate the numerous lofty peaks forming the back-ground of the picture, taken together constitute what is locally known as Mt. Seward. Some of the highest points are here shown, but the summit, lying back, nearly eastward of them, is probably not visible from any point on Long lake. The ascent was made from the right, up and along the range of minor peaks shown.

Inca-pah-cho is the old Indian name for Long lake, and has heretofore been little used. It implies lake-of-basswoods, or linden-water.

At Lake Raquette I found the guide whom I had selected to accompany me in the ascent of the mountain,—an elderly man, muscular, energetic, born and bred a hunter and skilled in wood-craft. A short day's journey, by Forked lake and Raquette river, brought myself and guide to the settlement on Long lake. Here I consulted Mitchell Sabbattis, the famous Indian, and others acquainted with the region near Mt. Seward, and was confirmed in a plan which I had formed of attempting the ascent at the south side, from the direction of the Preston ponds. Sabbattis affirmed that Mt. Seward had never been ascended, and certainly never measured, or he would have known of it. One of the lower peaks had been ascended and called Mt. Seward.*

The morning of October 13th, 1870, was bright and pleasant, and found us struggling to push our boat up the rapids of Cold river; a beautiful crystalline stream—haunt of the trout—which, fed by the springs on the mountain slopes, rushes sparkling down to pour its icy flood into Raquette river, a short distance below Long lake. From the foot of that lake we had seen the outlying ridges of Mt. Seward; now the forest which walled in the river concealed it from view. At length our progess became so slow, and the rapids so frequent, that drawing the boat ashore, we hid it, with my rifle and other luggage, in a thick copse.

Having lunched, we started to follow the north bank of the river, toward the Preston ponds, taking a sled-road leading to certain deserted lumber shanties, distant seven or eight miles, where we expected to camp that night.

We were armed each with a hunting knife and revolver,—the guide carrying in a pack three days' provisions, rubber and woolen blankets, and in his hand a hatchet. I was encumbered only with my barometer and satchel containing sketch-book and maps.

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* Since writing the above I have been informed that Prof. A. Guyot had previously made the ascent of Mt. Seward, and, in answer to an inquiry, he has kindly given me some notes of his expedition. The starting point was Adirondack village, and the time occupied two days. Mr. Ernest Sandoz, his nephew, undertook the ascent and measurement, but had the misfortune to cut his foot, which made the ascent the more difficult, after which he suffered an additional disheartening misfortune, in breaking his barometer before reaching the top of the mountain. My observations, therefore, seem to be the first ever taken upon the summit of Mt. Seward.

Our course along the river bank was a slow but constant ascent, as was proved by the numberless rapids and several falls which at short distances made the hurrying water whiten to foam. Step by step the stream descended its channel, and now our approach to the true Adirondacks became obvious. In the bed of the river were numerous huge boulders of labradorite rock or feldspar—sometimes called hypersthene granite—of the familiar bluish, ashen hue, which gives the beds of these mountain streams so peculiar an appearance. Before nightfall we had reached the terminus of the sled road, not far westward from the Preston ponds, but returned to make our camp in one of the old, long deserted lumber shanties. During the night sparks from the camp-fire caught in the roof; fortunately the flames were extinguished before they were beyond control, or the instruments on which the success of the expedition depended, might have been destroyed.

October 14th.—The camp was about thirty feet above Cold river, the banks of the stream being very steep. When we awoke, clouds and fog enveloped everything, and a drizzling rain was falling. Before 9 A. M. the fog lifted, the rain ceased, and finally, the clouds broke a little, though the mountains were still obscured. There was no wind. This was the first station where observations were made, four readings being taken.

Hour.	Barometer.	Attd. Ther.	Detd. Ther.
8.30 A. M.	28.150 inch.	52° 5 Fah.	53° 0 Fah.
8.42 "	28.175 "	53° 0 "	54° 5 "
8.45 "	28.200 "	53° 0 "	54° 5 "
8.50 "	28.225 "	54° 5 "	54° 0 "

I had previously determined the compass direction of the mountain, and notwithstanding the dubious state of the weather, set out immediately to commence the ascent. At the south, or south-east, Mts. Henderson and Santanoni were, alone of all the peaks, visible; and even their summits were hidden in the clouds. Taking a north-easterly course, we struck directly into the forest toward a small mountain, whence we might be able better to select the way. Our progress was slow, for, as there was no trail, my guide took the precaution to blaze the path, by chopping upon the trees every fifty or a hundred feet, and continued so to do, with great labor, throughout the day.

At length, reaching the height we had in view, we were disappointed to find it overlooked by another crest, more lofty than the one which we had climbed, and separated from us by a slight depression. Believing that from its top we would be able to discover Mt. Seward, we addressed ourselves to the task and laboriously climbed it, only to discover two loftier peaks towering opposite, beyond and above which the clouds, as they drifted, at times opened to view a misty summit higher than all. It was evident that we were already upon the slopes of the mountain. A narrow valley was between us and the opposite peaks; descending into it, we found the forest carpeted with deep, wet, sphagnous moss. Again ascending, the slope became all but precipitous; yet, by means of small trees, mainly silver-birches, we drew ourselves up.

Here the guide called my attention to a tree with its bark and wood torn by the claws of some large beast. In another place a bear had bitten a fallen tree to the core, and elsewhere left marks of his teeth on the wood. The tracks of deer and other wild animals were also observed, some of which were very recent; the deep moss was like snow and retained the impressions.

With much labor we at length climbed a ridge and saw no more peaks above us; the valley we had left was far down, and the surrounding country, wherever the eye could reach, spangled with lakes. Now the forest began to show that we had attained an altitude where vegetable life recoiled; the trees, principally Canada balsam, spruce and white birch, were dwarfed and stunted, being barely fifteen or twenty feet high. The abundant, deep moss was a sponge of icy water, so cold as to make our feet ache as we stood. In clambering upon hands and knees, as we were often compelled to do, we were wetted to the skin, waist high. Our breath was visible in the cold air, which chilled us through our wet clothing; yet the day, though windy, was now bright and clear.

After a hasty repast, we hurried along the ridge to gain the highest point upon it, being anxious to accomplish our work and descend part-way the same afternoon; not wishing to camp in that wet, cold region, where sleep, if possible, would be extremely hazardous.

About 3 P. M. we seemed to have gained the highest point on the ridge, though the thick, miniature forest, obscured the view, telling by its presence—before I had glanced at the instruments—that we were still far beneath the height ascribed to the mountain. Barometrical observations were here taken ; cloud fragments drifting through the forest, the while.

Hour.	Barometer.	Attd. Ther.	Detd. Ther.
3.26 P. M.	25.900 inch.	44° Fah.	40° Fah.
3.30 "	25.940 "	42° "	38° "
3.35 "	25.950 "	40° "	37° "
3.40 "	25.950 "	39°.5 "	37° "

Hardly had the above been noted before my guide, who had wandered off, returned to announce a still higher point in view. The barometer was returned to its case, and we hurried on. The balsam trees continued to dwindle in height, until we stood upon an open crest. The world seemed all below us; but northward, half a mile away, a lofty summit reared itself, grizzly with dead and withered balsams, struggling to keep their hold upon the rock that here and there looked out gloomily; it was Mt. Seward. Between us and it was an abyss through which clouds floated.

It was a grand, though disheartening spectacle; so near, yet seemingly inaccessible. The afternoon was nearly spent; it was evident that we would now be compelled to camp amid the clouds. However, evening and twilight continue upon the mountains long after the valleys are dark with shadows, and we determined to improve the time by attempting the passage of the gorge. At length, as the clouds parted, we noticed a narrow ridge, or "horse-back," far below, which crossed the deep valley, and on which it seemed that one might pass over.

Starting to descend, we discovered snow in small quantity, the remains of a last winter's drift, lying exposed to the air, discolored and icy. Its preservation thus must be exceptional. Descending amidst precipitous rocks, we reached the "horse-back," and, by hastening, were able at nightfall to cross the deep valley. With the last rays of the sun upon us, we formed a camp just below the true summit of the mountain, on the edge of the impenetrable thicket of dwarf balsams.

There was no spring, but water was easily procured by pulling up moss; the space thus made being soon filled with excellent cold water which, when settled, was sufficiently clear for use. The night came down dark and chill, and a strong westerly wind made the camp-fire burn fiercely. The rubber blanket, spread upon a thick bed of balsam boughs, kept me from the wet moss, and some of the small trees, piled bodily to windward, tempered the blast; the rear of the camp being a large rock.

At about eight o'clock in the evening the sky was lightened by that brilliant aurora borealis which excited such attention throughout the northern hemisphere by its wonderful iridescence, and brought the inhabitants of beleaguered Paris upon their ramparts, to gaze with awe at a manifestation by many deemed of dire import. It shot up from the north-west, and, passing over to the east, formed a broad crimson belt overhead; while the whole dome of the heavens was lit with silvery glory, which flashed and swayed in seeming concord with the eddies of a gale then whirling round the mountain. With every wave and brightening of the aurora a sighing, whispering sound was heard, like the rustling of great folds of silk, which my guide assured me was the "noise of the northern light." At the north-western horizon pencils of blue darted up toward the zenith, but I was in doubt whether the color was not that of the sky, seen through intervals in the auroral cloud. The rays seemed to center a few degrees south of the zenith. The display lasted long into the night. The guide, who was without coat or blanket, kept himself warm by chopping fire-wood, and we hailed the day with pleasure.

October 15th.—We had not far to ascend from our camp, before we reached a dense growth of dwarf balsam trees, which form a barrier to the summit. They were at first about seven or eight feet high; with much labor we pushed or chopped our way through them, their branches being stiff and numberless and intricately locked. At 8 A. M. we walked upon the trees, which had dwindled to great shrubs, flattened to the ground, with long, spreading, lateral branches, and stood at last upon the summit.

The view hence was magnificent, yet differing from other of the loftier Adirondacks, in that no clearings were discernible; wilderness everywhere; lake on lake, river on river, mountain on mountain, numberless. Northward was Whiteface mountain; then shone the lower Saranac lake, half hidden by Moose mountain, while below glittered Ampersand * pond. Looking eastward the mass of the Adirondack was seen, a sea of peaks; nearer, the serrate crest of Mt. McIntyre reared itself; but nearer still was Wallface mountain, viewed not from the east, but from the west; the reverse slopes descending steeply into a dark but broad valley, which seemed even deeper than the Adirondack or Indian Pass upon the other side of the mountain, yet, though gloomy with precipices, lacking the tremendous cliffs which give so much interest to the more famous gorge. A similar locality, somewhere in this neighborhood, was called by the Indians *Ouluska.* As Indian terminology is now generally preferred to modern names, I suggest this for the pass discovered.

The day was clear but cold, and a strongly westerly wind blowing. The hypsometric observations were as follows:

Hour.	Barometer.	Attd. Ther.	Detd. Ther.
9.10 A. M.	25.600 inch.	47° 0 Fah.	45° 0 Fah.
9.12 “	25.600 “	46° 0 “	44° 5 “
9.15 “	25.625 “	44° 0 “	43° 0 “
9.17 “	25.625 “	43° 5 “	42° 0 “
9.20 “	25.640 “	43° 0 “	42° 0 “
9.30 “	25.600 “	42° 0 “	42° 0 “

The height of the mountain had indeed been over-estimated. Of the 5,100 feet attributed to it, it lacked 638 feet; the elevation as measured being 4,462 feet above tide-level, or the sea.

The substance of the mountain was found to be labradorite rock; fragments broken from the summit exhibited crystals of opalescent feldspar, with beautiful play of colors; magnetic iron also occurred in small fragments scattered through the rock. It was late in the season for botanical observations, but the flora appeared similar to that of the neighboring summits which I have visited.

Of the provisions carried with us, there now remained only sufficient for one light meal. Since leaving the boat, it had taken us two days and a portion of a third to make the ascent, and we were now in the depths of the wilderness.

About 10 A. M. we commenced the descent, taking a new course west of south, and, under powerful incentives, by dint of rapid and hazardous traveling, at nightfall reached the boat, where our extra provisions and baggage were found undisturbed.

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* "Ampersand." I believe this to be incorrect etymology, and do not think that it is derived from the *and-per-se-and* termination of old alphabets; but attribute the name to the bright, yellow sandy shores and islands, which make it truly *Amber-sand lake.*

During the descent, near the foot of the mountain, we observed some scattering giant white-pines, some of which seemed to be between 150 and 200 feet in height, with diameter in proportion. The rest of the forest was dwarfed by their presence. On my return to Albany, I passed out of the wilderness by the Fulton chain of lakes, into Lewis county, and thence via Utica.

The barometer used was a mercurial cistern instrument, deer-skin bottom and brass scale. Before starting upon the expedition it was compared with the standard at the Dudley Observatory, and fortunately, for in returning it was broken. The deductions from the observations hereinbefore given have been calculated by Prof. Hough of the Dudley Observatory, which was the station for corrections. I inclose a note giving the results:

"DUDLEY OBSERVATORY,
Dec. 15th, 1870.

"DEAR SIR.—In accordance with your request, I have computed the height of your stations on Mt. Seward, from the barometrical observations you furnished me.

"The observations were reduced to thirty-two degrees Fahrenheit, and compared directly with the records given by our automatic registering instruments.

"The following is the data used:

DATE, OCTOBER, 1870.	Stations.	MT. SEWARD.			DUDLEY OBSERVATORY.	
		No. of readings.	Barometer 32 deg.	Temp. of air.	Barometer 32 deg.	Temp. of air.
14th, 8.45 A. M.	No. 1	4	28.144	54°	29.769	55
14th, 3.30 P. M.	" 2	4	25.905	38°	29.779	56
15th, 9.15 A. M.	" 3	6	25.580	43°	29.980	50

"As your barometer had previously been compared with our standard, and found to give essentially the same readings, no correction for scale has been necessary.

"At the time of the observations at the three stations, the variation of pressure was as follows:

"Station No. 1, barometer rising 0.004 inches hourly.
" 2, " rising 0.010 " "
" 3, " falling 0.002 " "

"As the longitude of Mt. Seward does not differ more than one minute of time from that of the Dudley Observatory, the observations may be directly compared with our own, without any sensible error.

"The following results have been deduced:

STATION.	Height above the Dudley Observat'y.	Height above tide-water.
Number 1	1,544 feet.	1,714 feet.
" 2	3,773 "	3,943 "
" 3	4,292 "	4,462 "

"The height of the barometer at the Dudley Observatory is assumed to be 170 feet above tide in the Hudson river.

Very truly yours,
G. W. HOUGH,
Director."

"Verplanck Colvin, Esq."

Before closing this report, I desire to call your attention to a subject of much importance. The Adirondack wilderness contains the springs which are the sources of our principal rivers, and the feeders of the canals. Each summer the water supply for these rivers and canals is lessened, and commerce has suffered. The United States government has been called upon, and has expended vast sums in the improvement of the navigation of the Hudson; yet the secret origin of the difficulty seems not to have been reached.

The immediate cause has been the chopping and burning off of vast tracts of forest in the wilderness, which have hitherto sheltered from the sun's heat and evaporation the deep and lingering snows, the brooks and rivulets, and the thick, soaking, sphagnous moss which, at times knee-deep, half water and half plant, forms hanging lakes upon the mountain sides; throwing out constantly a chilly atmosphere, which condenses to clouds the warm vapor of the winds, and still reacting, resolves them into rain.

It is impossible for those who have not visited this region to realize the abundance, luxuriance and depth which these peaty mosses—the true sources of our rivers—attain under the shade of those dark, northern, evergreen forests. The term "hanging-lake" will not be deemed inappropriate, in consideration of the fact that in the wet season a large mass of this moss, when compressed by the hands, becomes but a small handful, the rest of its bulk being altogether water; often many inches deep, it covers the rocks and boulders on the mountain sides, and every foot-print made has soon a shallow pool of icy water in it.

With the destruction of the forests, these mosses dry, wither and disappear; with them vanishes the cold, condensing atmosphere which forms the clouds. Now the winter snows that accumulate on the mountains, unprotected from the sun, melt suddenly and rush down laden with disaster. For lumber, once so plentiful, we must at no distant day become tributary to other States or the Canadas. The land, deprived of all that gave it value, reverts to the State for unpaid taxes.

The remedy for this is the creation of an ADIRONDACK PARK or *timber preserve*, under charge of a forest warden and deputies. The "burning off" of mountains should be visited with suitable penalties; the cutting of pines under ten inches or one foot in diameter should be prohibited. The officers of the law might be supported by a per capita tax, upon sportsmen, artists and tourists visiting the region; a tax which they would willingly pay if the game should be protected from unlawful slaughter, and the grand primeval forest be saved from ruthless desolation.

The interests of commerce and navigation demand that these forests should be preserved; and for posterity should be set aside, this Adirondack region, as a park for New York, as is the Yosemite for California and the Pacific States.

VERPLANCK COLVIN.

ALBANY, *Dec.* 16*th*, 1870.

DESCRIPTION OF NEW SPECIES OF FOSSILS

FROM THE

VICINITY OF LOUISVILLE, KENTUCKY, AND THE FALLS OF THE OHIO.

By James Hall and R. P. Whitfield.

During the investigations for the fourth volume of the Palæontology of New York, Dr. Knapp, of Louisville, Kentucky, kindly loaned many specimens for study and comparison. The value of the volume has on this account been much enhanced, and the author has endeavored to give due credit therefor. At the request of Dr. Knapp the new species now in my hands, belonging to his collection, are described in the following pages. Comparisons of known New York species, with specimens of the same species from this collection, have been made during the studies for the Palæontology of New York, and the results are given in the accompanying list. J. H.

Silurian Species.

Dictyonema pergracilis *n. sp.*

Frond irregularly spreading, composed of very fine, closely arranged meshes. Longitudinal filaments tortuous, not exceeding a fiftieth of an inch in width, and the spaces between about equal. Transverse filaments much narrower than the others, their distance equal to twice or thrice that of the longitudinal ones, giving to the openings an elongate hexagonal form. Serrations of the margins not observed. Surface of filaments minutely wrinkled.

This species is perhaps as nearly related to *D. gracilis* of the Niagara formation of New York, as to any known form, but it is much more finely reticulated, and the reticulations are more regular in their mode of growth than in that species.

Formation and locality. In the Niagara limestone, near Louisville, Ky. Cabinet of Dr. James Knapp.

Orthis nisis *n. sp.*

Shell depressed-pyramidal, when resting on the dorsal valve. Dorsal valve semi-elliptical, flat or slightly concave in the middle, and gently convex on each side; the length and width about as two to three; area about one quarter as wide as that of the ventral valve. Ventral valve depressed-pyramidal, the apex projecting backwards over the area; the elevation about equal to half the length of the dorsal valve; area twice as wide as high; fissure narrow, sides nearly parallel and extending to the apex.

Surface marked by strong angular striæ which are increased by interstitial additions to the number of twenty-eight or thirty on the margin of the shell; striæ crossed by distinct lamellose lines of growth.

Length five lines on the dorsal valve; width seven lines.

This species is of the type of *O. tricenaria*, but the beak is much more elevated, the area higher, and the striæ more angular, and are increased by interstitial additions, while in *O. tricenaria*, and its congener *O. pectinella*, the striæ are simple.

Formation and locality. In beds of the Niagara group, near Louisville, Ky. Cabinet of Dr. James Knapp.

ORTHIS RUGÆPLICATA *n. sp.*

Shell small, subquadrate, four-fifths as long as wide, gibbous, cardinal line nearly equal to the greatest width of the shell, angles obtuse, basal margin nearly straight. Dorsal valve convex, with a distinct median sinus extending from beak to base; area of valve linear. Length three lines, width four lines. Ventral valve depressed-pyramidal, marked along the center by a distinct angular plication or fold; beak pointed and projecting slightly backwards over the area; area moderate, less than one-third as high as wide, and divided in the center by a moderately wide fissure.

Surface marked by very strong, sharply angular plications, which are increased by interstitial additions, and of which there are about fifteen on the margin of each valve, with a few other incipient ones.

Formation and locality. In beds of the age of the Niagara group, near Louisville, Ky. Cabinet of Dr. James Knapp.

SPIRIFERA ROSTELLUM *n. sp.*

Shell rather below the medium size, somewhat subtriangular, with a long, projecting ventral beak, which is abruptly incurved at the extremity. Dorsal valve broadly elliptical, moderately ventricose, two-thirds as long as wide, with a proportionally broad, elevated or rounded mesial fold; three plications mark the valve on each side of the fold, the inner two originating as one at the apex and dividing below;

beak incurved. Ventral valve marked by a moderate mesial depression, and by four or five subangular plications on each side, the second on each side the mesial fold not extending to the beak, but having their origin at a lower point. Cardinal area proportionally high, undefined at the sides, but gradually rounding into the general surface of the valve; higher than wide.

Surface marked by fine, distinct, straight thread-like striæ, which, in the perfect condition, are crenulated by concentric striæ.

This species bears considerable resemblance to *S. Tiro* Barr. from the Silurian of Bohemia, but differs in the projection of the beak, and in the radiating striæ of the surface. Among the American Silurian forms it approaches *S. Eudora* Hall, most nearly, but is not so ventricose, and has a more projecting beak and fewer plications.

Formation and locality. In limestone of the age of the Niagara group, at Louisville, Ky. From the cabinet of Dr. James Knapp.

SPIRIFERA (CYRTIA) TRAPEZOIDALIS.

Spirifera (*Cyrtia*) *exporrecta* Wahlenberg, and *S. trapezoidalis* Hisinger, are identical according to Davidson.

A specimen, having the form and all the characters of the larger European forms of this species, occurs in the collection of Dr. Knapp. Another one, with much greater elevation of the ventral valve, var. *arrecta*, appears in the same association.

PENTAMERUS OBLONGUS *Sow.*

This species occurs near Louisville, in strata of the age of the Niagara group of New York.

A single specimen examined has the aspect and proportions of those from Rochester and other places in New York, but has a length of only one inch and a half. The messial lobe is well defined, and there is an indication of a sinus on each side, giving the incipient condition of the trilobate form of *P. trisinuatus* McChesney, which occurs more commonly in the northwest.

Another form of Pentamerus which we regard as of this species, var. *cylindrica*, occurs in the same locality; the shell has a length of two and a half to three inches. The beak of the ventral valve is often considerably extended, acute and incurved. The body of the shell usually preserves some faint indication of the prevailing lobed character of the species.

In this phase the fossil resembles the *Amphigenia* (*Pentamerus*) *elongata* of Vanuxem, but it is not so broad and gibbous in the upper part of the shell, and the valves are not usually appressed in front, as in that species.

Notwithstanding the wide deviation sometimes observed in these forms, there seems no sufficient reason for recognizing them as distinct species.

PENTAMERUS KNAPPI *n. sp.*

Shell broadly elliptical, moderately gibbous above, compressed in front; length about one-third greater than the breadth, somewhat obscurely trilobate; cardinal line equal to nearly half the width of the shell. Dorsal valve scarcely smaller than the ventral, moderately gibbous in the upper part, broadly depressed-convex below the middle, and spreading at the latero-basal margins. Ventral valve a little more gibbous in the middle above than the opposite valve, and less depressed in the lower part; the beak narrower below, closely incurved, and extending a little beyond that of the opposite valve.

Surface with strong plications in the middle, which reach only to the umbo, diverging and curving outward below; they are rounded, and repeatedly bifurcating, with the growth of the shell, so that there are about six times as many on the margin as at their origin; sides of the shell smooth or free from plications, the limit between the plicate and non-plicate portions indicated by a depression or sinus which gives an indistinct trilobed character to the shell. Marked everywhere by fine concentric striæ of growth.

In the single specimen examined, the ventral valve shows the single longitudinal septum, and the dorsal valve the two thin, gently diverging septa,—in these respects differing in no degree from *P. oblongus.*

This fossil recalls to mind at once the *Stricklandinia Gaspensis* Billings, but it has no sinus or fold in the middle of either valve, and it wants the straight hinge extension and narrow area, as well as the radii on the lateral portions of the shell, which are characteristic of that fossil.

In every feature, except the strongly radiated surface, this species does not differ from *Pentamerus oblongus;* and however unwarranted such a suggestion may appear at the present time, it is not improbable, when we compare some of the more extravagant forms already referred to that species, that intermediate ones may be found.

Formation and locality. In strata of the age of the Niagara group near Louisville, Ky. Cabinet of Dr. James Knapp.

PENTAMERUS NYSIUS *n. sp.*

Shell varying with age from broadly triangular with little gibbosity, to subquadrate from extension of the mesial portion in front with increasing gibbosity; in larger specimens assuming an ovoid form, and sometimes becoming obscurely trilobate. Dorsal valve less convex than the ventral, and varying from depressed-convex to ventricose; in some conditions having a mesial elevation, becoming angular along the cardinal slope with the margins abruptly incurved; the incurved spaces usually free from plications; beak closely incurved into the triangular fissure of the opposite valve. Ventral valve more convex, varying from depressed-convex to ventricose, and strongly arcuate in older shells; with or without a mesial fold, which becomes developed with age and produced in front; beak in young shells scarcely incurved, becoming more arcuate with age, projecting above and beyond the umbo of the dorsal valve, and showing beneath it the upper part of the triangular fissure. Cardinal slopes, especially in the older shells, abruptly incurved and concave.

Surface marked by distinct and well-defined, simple, rounded or subangular radii, which vary in strength at different stages of growth and in shells of the same size, the number ranging from twenty-five to forty in shells of medium size. In the perfect condition the surface is marked by fine concentric striæ and with distinct rugose lines or lamellæ of growth.

In the specimens examined (fourteen in number), there is a great variety of aspect and of surface marking. The smallest specimen is about four lines in length, with a somewhat greater width, and a depth of a little more than two lines; while the largest specimen has a length of two and a quarter inches, a width of a little more than one and three-quarters, and a depth of nearly one inch and a half. Some of the younger shells are marked with fine and some with coarse radii. One specimen of intermediate size has a length of scarcely an inch, a breadth of one inch and two lines, and a depth of six-tenths of an inch; the surface is marked by forty-one radii. Another specimen has a length of one inch and four-tenths, a width of little more than one inch and two-tenths, and a depth of seven-tenths of an inch; the surface is marked by twenty-five strong radii.

Two distinct varieties may be recognized; the one having coarse and the other with finer radii, which may be designated as *P. Nysius* var. *crassicosta* and *P. Nysius* var. *tenuicosta.*

In form and surface markings this species bears some resemblance to *P. multicostatus* H., but the latter is proportionally more gibbous in the umbonal region and slopes more abruptly to the front, with no indication of mesial fold or extension, but rather a faint depression with truncate anterior margin.

Formation and locality. In beds of the age of the Niagara group, near Louisville, Ky. Cabinet of Dr. James Knapp.

PENTAMERUS LITTONI *Hall.*

(Pal. N. Y., Vol. 3, p. 262.)

The *Pentamerus Littoni* is of the same type as the one just described; and in the collection now under examination there are two or three specimens which may be referred to this species. Its general aspect is more gibbous and cylindrical than the preceding.

The reference of this species in Pal. N. Y., vol. 3, to the probable age of the Lower Helderberg, should doubtless be corrected; and since it is well known that species of both the age of Lower Helderberg and Niagara are found mingled in the locality there cited, it is almost certain that the *Pentamerus Littoni* is from the Niagara group.

MURCHISONIA PETILA *n. sp.*

Shell small, spire elevated, slender and regularly tapering from the base to the apex; volutions about twelve, gently and regularly expanding from the apex, moderately convex, somewhat obtusely subangular below the middle, last one scarcely ventricose. Aperture subrhomboidal.

Surface unknown.

Length of specimen one inch; diameter of last volution, seven-twentieths, and height four-twentieths of an inch.

Formation and locality. In limestone of middle Silurian age, near the Falls of the Ohio. Cabinet of Dr. James Knapp.

EUOMPHALUS (CYCLONEMA) RUGÆLINEATA *n. sp.*

Shell depressed turbinate, consisting of three or more rounded, rapidly increasing volutions, which are marked by ten or twelve strong, sharply elevated, revolving lines, having smaller ones between them; the two sets of lines becoming more equal below the center of the volution; the whole crossed by irregular lamellose transverse lines of growth, which give a very rugose character where they cross the revolving lines. Aperture rounded; form of base and columella not determined.

This species bears considerable resemblance to *Euomphalus carinatus* Sow., from the upper Silurian of England, as figured in *Murchison's Siluria*, but differs in having a less number of revolving carinæ, and in the possession of the intermediate lines, as also in the character of the transverse striæ.

Formation and locality. In limestones of the age of the Niagara group at Louisville, Ky. Cabinet of Dr. James Knapp.

ILLÆNUS CORNIGERUS *n. sp.*

Among the fossils in Dr. Knapp's collection from the Niagara limestone, near Louisville, Ky., there is a specimen of *Illænus*, which bears some resemblance to *I. armatus* Hall, 20th Report State Cabinet, p. 330, pl. 22, figs. 1–3, in the general form of the glabella and pygidium, and also in the large prominent eyes. The posterior angles of the movable cheeks are, however, extended obliquely backward and outward, into long, curved spines of considerable strength, projecting at an angle of forty-five degrees to the axis of the body, instead of being directed exactly backwards, as are the short spines of that species. The facial suture does not curve outward in front of the eye, as in that species, and is more rounded in front, giving to this part of the glabella a narrower form and a greater anterior breadth and extent to the movable cheek. In the form of glabella and spines, it is so entirely distinct from any other species described, that it cannot easily be mistaken.

Formation and locality. In limestone of Niagara age, at the Falls of the Ohio. From the cabinet of Dr. James Knapp.

Devonian Species.

Discina (Orbiculoidea ?) grandis *Vanuxem.*

This species, presenting all the characteristic features of the same in the Hamilton Group of New York, occurs in the Hydraulic beds of the upper limestones, at the Falls of the Ohio. In a single specimen preserving both valves, the ventral valve measures one inch and four-tenths in its longest diameter. A single ventral valve of the same is slightly larger, and a separate dorsal valve measures one inch and three-tenths, with an elevation of about half an inch; in this one the apex is slightly turned to one side, as in all well preserved specimens from the Hamilton group.

The specimens are from the cabinet of Dr. James Knapp, of Louisville, and were obtained from the upper limestones at the Falls of the Ohio.

Discina (Trematis) truncata *Hall.*

This species, possessing all the characters of the same in the Genesee slate of New York, occurs in great numbers in the black slate, near the Falls of the Ohio. The shell is somewhat thicker than is usual in New York, but differs in no important character.

From the cabinet of Dr. James Knapp, of Louisville, Kentucky.

Crania Bordeni *n. sp.*

Shell depressed conical, about half as high as wide; beak subcentral, slightly nearer the anterior end. Surface marked by fine radiating striæ, and somewhat strong lines of growth, giving a rugose character to the surface, especially toward the margin.

A similar form from the Hamilton group of New York, *C. crenistriata*, is much more coarsely striated.

Formation and locality: Adhering to *Spirifera Oweni*, Devonian limestone, from McCoy's quarry, Clarke county, Indiana. From W. W. Borden, New Providence, Indiana.

AVICULOPECTEN CRASSICOSTATA *n. sp.*

Shell below medium size, left valve depressed, convex; body of shell oblique, hinge line straight, equal to three-fourths the length of the shell; anterior wing very small, separated from the body of the shell by an abrupt, deep sinus; posterior wing narrow, obtusely pointed and extending nearly as far as the posterior extremity.

Surface marked by strong, coarse, angular ribs, of which there are about thirteen or fourteen on the body of the shell, with intermediate smaller ones; about five obscûre rays on the posterior wing; the radiating costæ crossed by coarse, distant lamellose concentric ridges.

Formation and locality. In limestone of the age of the Upper Helderberg group, at the Falls of the Ohio. Cabinet of Dr. James Knapp.

CARDIOPSIS CRASSICOSTA *n. sp.*

Shell large and robust, with moderately ventricose, broad, and obliquely oval valves; beaks strong, prominent, rounded, obtuse and slightly incurved, situated considerably within the anterior extremity. Anterior end rounded into the antero-basal margin; margin more abruptly curving around the postero-basal extremity, and thence obliquely rounded forward and upward to the extremity of the short hinge line, giving the greatest height and extension at the postero-basal end.

Surface marked by about forty-four or forty-five strong, simple, rounded radii, which, with the exception of a few at the anterior end, have a general backward direction. Those on the anterior end are curved forward as they approach the margin of the shell, and are generally broader than those of the middle of the valve. Height of the valve, exclusive of the beaks, two and seven-tenths inches; greatest length, measured from the beaks to the postero-basal extremity, two and four-tenths inches.

This species approaches in character the *C. robusta* of the Portage group of New York, but differs slightly in the number of radii, that one having an average number of thirty-eight; it also differs in the closely arranged radii being without the intermediate space which characterize that species. The beaks are also larger and more prominent.

Formation and locality. In the upper limestones at Louisville, Ky.; from the cabinet of Dr. James Knapp. Also in the Schoharie grit in the State of New York.

Lucina (Paracyclas) elliptica *Hall* var. occidentalis.

Shell orbicular, of medium size, nearly circular in outline, with regularly convex valves and small closely appressed and approximate beaks, centrally situated. Cardinal border very slightly excavated just anterior to the beaks, but rounded and full behind. The sinus just within the posterior cardinal margin (so characteristic of the group) is but slightly developed.

Surface marked by strong, sharp striæ, which are often developed into irregular concentric ridges.

This species has been usually considered identical with *Lucina* (*P.*) *proaria* of Goldfuss, from the Devonian of the Eifel, but the beaks are less prominent, and the cardinal line less straight on the posterior side and less excavated anteriorly, while the surface is much more strongly marked concentrically.

The *L.* (*P.*) *elliptica*, as it occurs in the limestones of New York, is usually in the condition of casts of the interior, and the surface marking is rarely seen. They are, moreover, usually vertically compressed and otherwise distorted, appearing sometimes abruptly fusiform.

The difference in aspect between the specimens from the eastern and western localities is apparently mainly due to the preservation of the shell in the latter. The relative position of the beaks is likewise influenced by the direction and degree of pressure.

Formation and locality. In the upper limestones, near Louisville, Ky.; at Charleston Landing and elsewhere on the Indiana side of the Ohio river. From the cabinet of Dr. James Knapp, and from former collections of Major S. S. Lyon.

Cypricardinia inflata var. subequivalvis *n. sp.*

Shell small, nearly equivalve, subcylindrical, beaks terminal; cardinal and basal margins subparallel; left valve slightly smaller, less convex, and straighter than the opposite; the post-umbonal slope distinctly angular, while on the right valve it is subangular or rounded.

Surface marked by about twelve to fourteen or sixteen strong, equal, lamellose, concentric ridges.

The valves are sometimes so nearly equal in convexity, particularly when crushed, that they might be considered as equal; several good specimens, however, clearly prove the slight inequality characterizing the genus.

This shell resembles *C. inflata* (*Cypricardites inflata* of Conrad), but the valves are more nearly equal, and the right valve is less inflated.

Formation and locality. From the crinoidal beds above the "Hydraulic beds," near Louisville, Ky. Cabinet of Dr. James Knapp.

CYPRICARDINIA? CYLINDRICA *n. sp.*

Shell cylindrical, extremities rounded, height little more than the depth, and rather more than twice as long as high; beaks nearly terminal, rounded and incurved; left valve scarcely less convex than the opposite; umbonal slope slightly angular.

Surface marked by faint, distant, concentric, lamellose lines.

The specimen described is essentially a cast preserving a portion of the shell on one side.

This species is more elongate and cylindrical, less arcuate, and more equivalved than *C. inflata.* The lamellose striæ have never been so strong, and are more distant.

Formation and locality. In the "Hydraulic beds" of the age of the Upper Helderberg limestone, near Louisville, Ky. From the cabinet of Dr. James Knapp.

YOLDIA? VALVULUS *n. sp.*

Shell narrow, subelliptical, more than twice as long as high; the depth a little more than half the height; the anterior end nearly one-fourth wider than the posterior. Beaks situated at three-fifths the length from the anterior end; an obsolete post-umbonal ridge extending from near the beak to the post-basal margin; posterior extremity not recurved.

Surface marked by somewhat coarse, wavy, concentric lines, to the post-umbonal ridge, above which they are even and much finer.

Formation and locality. From the "Hydraulic beds," near Louisville, Ky. Cabinet of Dr. James Knapp.

NUCULA NIOTICA *n. sp.*

Shell small, obtusely cuneiform, the beaks prominent, incurved, with the umbo inflated; height from beak to base equal to three-fourths the length of the shell.

Surface marked by fine, even, concentric striæ, with sometimes strong varices of growth.

The internal casts show the evidence of strong anterior and posterior muscular impressions, and three distinct umbonal pedal muscles, seven or more posterior, and five anterior teeth in a specimen of medium size. The largest specimen measured is three-eighths of an inch long.

This species resembles *Nucula parva* McChesney, from the coal measures.

Formation and locality. In the upper beds of the Limestone, near Louisville, Ky. Cabinet of Dr. James Knapp.

Nucula neda *n. sp.*

Shell rhomboid-ovate, cuneate, with the umbones ventricose; the beak a little more than one-third from the anterior end, prominent and incurved; cardinal margin sloping to the anterior and posterior extremities; basal margin broadly rounded.

The cast shows strong anterior and posterior muscular impressions, with three or four umbonal muscular scars; a narrow pedal scar just within the cardinal line anterior to the posterior muscular area, as usual in the genus.

The number of teeth cannot be determined, but there are as many as six or eight on the posterior side, with a distinct ligamental cavity in the cast beneath the beak.

The surface has been marked by fine concentric striæ.

This species is of the size, and similar in aspect, to the *Nucula levata* of the lower Silurian rocks, and differs but little from *Nucula billastriata* of Conrad, which is a large species from the Hamilton group of New York.

Formation and locality. In the "Hydraulic beds" near Louisville, Ky. From the cabinet of Dr. James Knapp.

Tellinomya subnasuta *n. sp.*

Shell unequally ovate, twice as long as high, with very ventricose valves, giving a subcylindrical form anterior to the beaks; posterior end very narrow, pointed at the extremity; anterior end broadly rounded, longest above the center; basal line very slightly sinuate opposite the small appressed beaks which are situated at two-thirds the entire length from the anterior extremity. Muscular impressions of moderate size, distinctly marked, situated near the margins of the valve; pallial line entire, composed of a series of radiating pustules, as seen on the cast. Crenulations of the hinge not distinctly seen, but the evidence possessed would indicate them to have been minute.

Surface marked by distinct, rather strong, somewhat lamellose lines of growth.

The characters of this shell and several similar ones have not been fully determined. The external form is very like some species of Tellinomya, but the condition of the hinge is such that no satisfactory determination can be made at the present time, though we have evidence of fine crenulations on one or both sides of the beaks. Possessing external characters which separate it from NUCULA, NUCULITES, and PALÆONEILA, it can only be referred to TELLINOMYA from this negative information. When fully known, it will probably prove to be a distinct genus, for which the name DYSTACTELLA may be used.

Formation and locality. In the upper Helderberg formation near Louisville, Ky. From the cabinet of Dr. James Knapp.

PTYCHODESMA *nov. gen.*

πτυχος plicœ and *δέσμα vinculum.*

Shell modioloid in form; valves equally convex; hinge with a wide ligamental area, the sides of which are sharply grooved in parallel lines, caused by the successive growth of the ligament, as in PECTUNCULUS. The grooves and ridges are slightly arched beneath the apex of the valves where they take their origin.

The internal hinge structure is unknown.

Of two specimens examined, one has a length of nearly an inch and a half, and a height of somewhat more than an inch; the other has the same proportions and is a little less in size.

In general form and surface characters this genus resembles MODIOMORPHA, but differs in having a ligamental area. Externally it is unlike Cypricardites and similar shells, which have a ligamental area marked by fine striæ parallel to the hinge line, while these are parallel to the margin of the shell.

The type of the genus is *Ptychodesma Knappiana.*

PTYCHODESMA KNAPPIANA *n. sp.*

Shell obliquely ovate, compressed posteriorly, and more or less ventricose in the middle and toward the front; hinge line short, beaks subterminal; anterior end truncated at right angles to the hinge line.

Surface marked by fine concentric striæ, with more distinct laminæ of growth.

Ligamental area well developed, sublinear, deeply grooved on the sides, the grooves and intermediate ridges slightly inclined toward the hinge line on both sides of the apex. The area shows seven grooves and eight ridges on each valve; but these increase in number with the growth of the shell, and are, therefore, not of specific value.

This shell bears much resemblance externally to some forms of MODIOMORPHA and NYASSA; but the deeply grooved ligamental area is a distinctive feature.

Formation and locality. In the "Hydraulic beds" at Louisville, Ky. Cabinet of Dr. James Knapp.

POLYPHEMOPSIS LOUISVILLÆ *n. sp.*

Twenty-third Report on the N. Y. State Cabinet, Plate 12, figs. 1 and 2.

Shell small, ventricose, consisting of about six rapidly tapering volutions, the last of which comprises about two-thirds the entire length of the shell. Aperture large, ovate, widest below the middle, and pointed at the upper angle; a little more than half as long as the shell. Columella slight; suture scarcely impressed. Surface smooth.

Formation and locality. In the Upper Helderberg limestone at the Falls of the Ohio. From the cabinet of Dr. Knapp, of Louisville, Ky.

LOXONEMA HYDRAULICA *n. sp.*

Shell slender, turreted; volutions, about nine in a specimen one inch in length, rounded, rapidly ascending; suture deep, giving a constricted aspect to the shell; striæ distinct, angular, somewhat abruptly bent backward from the suture to the summit of the volution, which is above the middle of its length; thence curving more gently forward to the suture, and on the last volution abruptly recurved to the columellar lip.

Formation and locality. In the hydraulic limestone of the Falls of the Ohio. Cabinet of Dr. James Knapp.

TROCHONEMA EMACERATA *n. sp.*

Shell turbinate, consisting of four or five volutions, the upper ones moderately convex and bicarinate; the suture line commences a little below the second carina. The last volution is very ventricose with a rounded aperture; umbilicus small.

Surface marked apparently only by lines of growth.

This species differs from *T. tricarinata* Meek, in the more elevated spire, the sloping upper side of the volutions between the suture and first carina, and in having two carinæ with an interspace equal to that above and below, while there is no evidence of a carina bordering the narrow umbilicus.

Formation and locality. In limestone above the "Hydraulic beds," near Louisville, Ky. Cabinet of Dr. James Knapp.

TROCHONEMA RECTILATERA *n. sp.*

Shell turbinate, breadth and height almost equal; volutions about five, carinated above with straight, nearly vertical sides; outer one ventricose, with two distant carinæ having a wide, vertical, slightly concave space between, which occupies more than one-third the height of the volution. Upper side of the volutions convex for half the distance to the carina, and below this they are concave, giving the form of an ogee.

In another specimen, apparently identical, the upper side of the volutions are slightly concave and regularly sloping downward from the suture to the carina. Lower side of the volution not carinate; umbilicus small, or closed with a callosity.

Surface marked by fine striæ of growth, which are turned backward from the suture, and are vertical on the sides of the volution, and on the lower side curve backward to the umbilical area.

Formation and locality. In the upper limestones at the Falls of the Ohio. Cabinet of Dr. James Knapp and other collections.

TROCHONEMA YANDELLANA *n. sp.*

Shell turbinate, volutions about five (three of which are preserved in the specimen), rapidly increasing, carinated; the last volution becoming ventricose and marked by seven revolving carinæ, including the one bordering the somewhat channeled suture; four of the carinæ are distinctly marked by thin lanceolate nodes, which become more prominent with the increased growth of the shell, while the other three,—one bordering the suture and two on the lower middle portion of the volution,—are destitute of nodes (in the specimen described), but may possibly assume this character in more advanced stages of growth. The carinæ are situated, one at the suture and one bordering the moderately large umbilicus, with five on the body of the volution, of which two are above the middle and three below; the spaces separating those bordering the suture and umbilicus from those on the body of the volution, are considerably wider than the spaces between the intermediate carinæ. Aperture rounded, slightly modified by the carinæ.

Surface marked by fine transverse striæ of growth, which turn backward as they cross the volution, to the umbilicus.

This species has the general form and proportions of *T. umbilicuta* Hall, from the Trenton limestone, and also of *T. tricarinata* Meek, from the Upper Helderberg limestones, but differs from both in the greater number of carinæ and in their nodose character.

Formation and locality. In the "Hydraulic beds," near Louisville, Ky. Cabinet of Dr. James Knapp.

PLEUROTOMARIA ESTELLA *n. sp.*

Shell small, depressed-conical, umbilicate; volutions about four or five; ventricose; regularly enlarging from the apex; suture line just below the periphery of the volution; aperture circular.

Surface marked by sharp, revolving striæ, of which ten are above the periphery and ten below on the outer volution, and with a broader and slightly more prominent band on the periphery; the revolving striæ are crossed by fine transverse ones originating at the suture and bending abruptly backward on the upper part of the volution.

The character of surface marking is quite similar to that of *P. lineata* of the Hamilton group; but the spire is more depressed, and the volutions enlarge more rapidly.

Formation and locality. In limestone, above the "Hydraulic beds" at the Falls of the Ohio. Cabinet of Dr. James Knapp.

PLEUROTOMARIA IMITATOR *n. sp.*

Shell subhemispherical; spire moderately elevated, consisting of four or five rounded volutions, regularly increasing from the apex to the aperture, which is subcircular; rounded below and broadly umbilicate; suture distinct, not channeled, situated at the periphery of the preceding volution.

Surface of the upper sides of the volution marked by strong ridges, which have a slight bend just below the suture, and thence curve backward to the periphery, gradually increasing in strength from the apex to the outer volution, on the middle of which they are in the ratio of about twenty to an inch; on the outer half of the last volution they become gradually obsolete, or merge into the growth striæ, which also mark every part of the surface. Below the periphery there are apparently none of the ridges existing.

This species is very similar to *P. lucina* in form, being a little more depressed and the volutions less rapidly increasing. The surface markings are more nearly like those of *P. arata*, while the volutions are more ventricose on the upper side, and the periphery is apparently destitute of a band or sinus.

Formation and locality.—In the limestones below the "Hydraulic beds," at the Falls of the Ohio. Cabinet of Dr. James Knapp, and from Major S. S. Lyon, of Jeffersonville, Ga.

BUCANIA DEVONICA *n. sp.*

Shell discoid, widely and equally umbilicate on the two sides; remaining volutions about four, slightly embracing, vertically compressed, giving the transverse diameter a little more than twice the vertical diameter; lateral margins of the volutions obtusely angular toward the dorsal side.

The surface has apparently been marked by several (three or four) revolving ridges or carinæ on each side of the center or dorsum, which is gently concave; finer surface markings and aperture unknown.

Formation and locality. In limestone, below the "Hydraulic beds," near Louisville, Ky. Cabinet of Dr. James Knapp.

List of Species of Fossils from the Falls of the Ohio, the vicinity of Jeffersonville, Indiana, and the neighborhood of Louisville, Kentucky.*

Silurian Species.

Crinoidea.

Actinocrinus Meekii *Lyon.*
Saccocrinus Christii *Hall.*
Eucalyptocrinus cœlatus *Hall.*
Eucalyptocrinus crassus *Hall.*
Melocrinus obconicus *Troost.*
Lecanocrinus——(n. sp.)
Haplocrinus maximus *Troost.*
Caryocrinus ornatus *Say.*
Pentremites Reinwardtii *Troost.*

Brachiopoda.

Orthis elegantula *Murchison.*
Orthis hybrida *Murchison.*
Strophomena rhomboidalis *Wahlenberg.*
Streptorhynchus subplana *Conrad.*
Spirifera radiata *Sow.* = *Sp. cyrtæna* Dalman.
Spirifera Niagarensis? *Conrad.*
Spirifera bicostata *Vanuxem.*
Spirifera Eudora *Hall.*
Cyrtia myrtia? *Billings* = *C. exporrecta* Dalman.
Meristina nitida *Hall.*
Meristina nitida *var.* oblata *Hall.*
Meristella Maria *Hall.*
Rhynchospira globosa: *var.* parva *H. & W.*
Atrypa reticularis *Linnæus*

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* The following list of Silurian and Devonian fossils is made up from collections which have passed under examination during the preparation of the Palæontology of New York. These fossils have been derived chiefly from the cabinet of Dr. James Knapp, of Louisville, Kentucky, while many have been received from Prof. James R. Eaton, Major S. S. Lyon, and from personal collections made in 1841 and at subsequent periods.

Atrypa nodostriata *Hall.*
Atrypa marginalis *Dalman.*
Rhynchonella Saffordii *Hall.*
Rhynchonella Tennesseensis *Roemer.*
Rhynchonella ascinus *Hall.*
Pentamerus galeatus* *Dalman.*
Pentamerus oblongus *Sowerby.*
Pentamerus (Anastrophia) interplicatus *Hall.*
Pentamerus Knappi *H. & W.*
Pentamerus (Gypidula) nysius *var.* tenuicosta *H. & W.*
Pentamerus nysius *var.* crassicostata *H. & W.*
Pentamerus Littoni *Hall.*
Orthonota curta *Conrad.*
Platyostoma Niagarensis *Hall* = *P. trigonostoma* Meek.
Lituites Marshii *Hall.*
Illænus Barriensis *Murchison.*
Cyclonema cancellata *Hall.*

Devonian Species.

CRINOIDEA.

Actinocrinus Cassedayi *Lyon.*
Actinocrinus eucharis *Hall.*
Actinocrinus Kentuckensis *Shumard.*
Actinocrinus pentaspina *Lyon.*
Actinocrinus —— sp. undeter.
Megistocrinus abnormis *Lyon.*
Megistocrinus depressus *Hall.*
Megistocrinus Knappii *Lyon.*
Megistocrinus Ontario *Lyon.*
Megistocrinus rugosus *Lyon & Casseday.*
Megistocrinus spinulosus *Hall.*
Megistocrinus (Hadrocrinus) plenissimus *Lyon.*
Dolatocrinus (Cacabocrinus) glyptus *Hall.*
Dolatocrinus (Cacabocrinus) lacus *Lyon.*
Dolatocrinus (Cacabocrinus) sculptilis *Troost.*
Dolatocrinus (Cacabocrinus) —— n. sp.?
Cyathocrinus læviculus *Lyon.*
Cyathocrinus sculptilis *Lyon.*
Cyathocrinus Wortheni *Lyon.*

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* On the authority of Dr. Knapp.

Cyathocrinus (Vasocrinus) valens *Lyon.*
Cyathocrinus (Vasocrinus) —— n. sp.
Rhodocrinus Hallii *Lyon.*
Platycrinus Leai *Lyon.*
Codaster alternatus *Lyon.*
Nucleocrinus angularis *Lyon.*
Nucleocrinus Verneuilii *Troost.*
Nucleocrinus elegans ? (n. sp. ?)
Eleutherocrinus Cassedayi *Yandall & Shumard.*
Anchyrocrinus spinosus *Hall.*

BRACHIOPODA.

Lingula subspatulata *M. & W.*
Orthis livia *Billings.*
Orthis —— sp ?
Strophomena rhomboidalis *Wahl.*
Strophodonta inequistriata *Conrad.*
Strophodonta demissa *Conrad.*
Strophodonta hemispherica *Hall.*
Strophodonta perplana *Conrad.*
Chonetes acutiradiata *Hall.*
Chonetes Yandellana *Hall.*
Productella subaculeata * *Murchison.*
Productella subaculeata *var.* cataracta.
Spirifera acuminata *Conrad.*
Spirifera arctisegmenta *Hall.*
Spirifera duodenaria ? *Hall.*
Spirifera euruteines *Owen.*
Spirifera fimbriata *Conrad.*
Spirifera gregaria *Clapp.*
Spirifera medialis *Hall.*
Spirifera Oweni *Hall.*
Spirifera raricosta *Conrad* = *S. undulata* Vanuxem.
Spirifera segmenta *Hall.*
Spirifera varicosa *Conrad.*
Cyrtina crassa *Hall.*
Cyrtina Hamiltoniæ *Hall.*

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* There may be some doubt regarding the identity of this form with *P. subaculeata*, and the varietal name *P. cataracta* is, therefore, proposed. See Pal. N. Y., vol. IV, pp. 154, 155, etc., for discussion of the relations of this and allied forms.

Trematospira hirsuta *Hall.*
Nucleospira concinna *Hall.*
Athyris spiriferoides *Eaton.*
Athyris vittata *Hall.*
Meristella nasuta *Conrad.*
Meristella (Pentagonia) unisulcata *Conrad.*
Atrypa reticularis* *Linnæus.*
Atrypa aspera *Schlotheim.*
Rhynchonella (Stenocisma) tethys *Billings.*
Pentamerella arata *Conrad.*
Terebratula harmonia *Hall.*
Cryptonella lens *Hall.*
Cryptonella rectirostra.

LAMELLIBRANCHIATA.

Pterinea flabellum *Conrad.*

This species occurs in the upper limestone of the Falls of the Ohio, and elsewhere in that neighborhood, as well as in limestone of the same age in the State of Ohio. It presents a great variety of aspect in its gradation from the young to the mature and older condition of the shell, in which it might readily be mistaken for different species. In the examination of several hundred specimens from the rocks of New York and the west, this species has been found to range from the upper limestone of Ohio through the Hamilton and Chemung groups of New York, and to present such extreme varieties that one plate in the Palæontology of New York, Vol. V, has been found insufficient for the illustration of its exterior forms and internal structure.

Limoptera cancellata: *var.* occidens *H. & W.*
Aviculopecten pecteniformis *Conrad.*
Aviculopecten princeps *Conrad.*
Aviculopecten parilis *Conrad.*

Forms referable to these three species of Conrad occur in the upper limestone of the Falls of the Ohio, and in that neighborhood, as well as in the same limestone in Indiana and Ohio, and also in the Hamilton group of New York. On examination of a large number of specimens, it appears probable that the three species mentioned above may all be included under one term.

Nuculites triquetra *Conrad.*
Modiola (Modiomorpha) concentrica *Hall.*
Grammysia (Leptodomus) secunda: *var.* gibbosa *H. & W.*

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* The variety referred to *A. prisca*, Pal. N. Y., vol. IV, page 324, foot note, may for convenience o reference be designated as var. *nuntia*, l. c., pl. 51, figs. 10-24; while it will be convenient to designate the gibbous form, plate 52, figs. 4-6, as *A. reticularis* var. *ventricosa*.

Lucina (Paracyclas) elliptica *Hall.*
Posodonia (=Paracyclas) lirata *Conrad=Lucina Ohioensis* Meek.
Conocardium trigonale *Hall = Conocardium Ohioensis* Meek.

GASTEROPODA.

Platyceras rictum *Hall.*
Platyceras fornicatum *Hall.*
Platyceras dumosum *Conrad = P. multispinosum* Meek.
Platyceras dumosum *var.* rarispina *Hall.*
Platyostoma lineata *Conrad.*
Pleurotomaria lucina *Hall.*
Pleurotomaria sulcomarginata *Conrad.*
Murchisonia desiderata *Hall.*
Loxonema Hamiltoniæ *Hall.*
Loxonema (Isonema) bellatula *Hall.*
Naticopsis lævis *Meek.*
Naticopsis (Turbo) Shumardii *De Verneuil.*
Bellerophon Lyra *Hall.*
Bellerophon Leda *Hall.*
Bellerophon patulus * *Hall = B. Newberryi* Meek.

CEPHALOPODA.

Gomphoceras turbiniformis *M. & W.*
Goniatites discoideus *var.* Ohioensis *Hall.*

CRUSTACEA.

Phacops rana *var.* bufo *Green.*
Dalmanites myrmecophorus *Green.*
Dalmanites Ægeria *Hall.*
Dalmanites Helena *Hall = D. Ohioensis* Meek.
Dalmanites selenurus *Eaton.*
Dalmanites Calypso *Hall.*
Dalmanites Pleione *Hall.*
Proetus crassimarginata *Hall.*
Proetus canaliculatus *Hall.*

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* The specimens of this species which have been examined, from the Falls of the Ohio and other western localities, when compared with a series of New York specimens, show no specific differences. The western specimens are usually destitute of the expanded aperture, and are apparently less robust than those of the Hamilton group in New York.

SUPPLEMENT.

The species of Pentamerus, cited on page 197 as *P. galeatus*, proves, on an examination of specimens, to be a distinct form, occurring at a horizon below the known limits of that species; and may be described as follows:

PENTAMERUS NUCLEUS *n. sp.*

Shell small, subglobose, with strongly inflated ventral umbo; width a little greater than the length. Ventral valve much the larger; very ventricose; cardinal margins rounded, from the body of the valve to the border of the somewhat small foramen; middle of the valve elevated, forming a fold. Dorsal valve transversely elliptical, strongly convex, umbo somewhat inflated; the middle of the valve depressed, forming a strong sinus; cardinal border rounded, leaving the beak prominent above the line and strongly incurved beneath the opposite ventral beak.

Surface marked by comparatively strong angular plications, about seven on the dorsal valve and six on the ventral. Two of these, depressed on the dorsal and elevated on the ventral side, form the mesial fold and sinus.

This species somewhat resembles small individuals of *P. galeatus*, and seems to be intermediate between that and *P. fornicatus* of the Clinton group of New York.

Formation and locality.—In limestone of the Clinton group, near Louisville, Kentucky. From the collection of Dr. Knapp.

REMARKS ON SOME PECULIAR IMPRESSIONS

IN

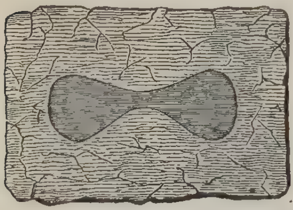
SANDSTONE OF THE CHEMUNG GROUP, NEW YORK.

BY JAMES HALL AND R. P. WHITFIELD.

During the summer of 1869, while engaged in some geological investigations in Cattaraugus county, New York, the Rev. Sylvester Cowles, of Gowanda, was visited, for the purpose of obtaining some definite knowledge in relation to certain fossil impressions in sandstone, commonly known as "horse tracks," occurring in the vicinity of Salamanca, Cattaraugus county, to which Mr. Cowles had called the attention of several persons during the previous year, and had also sent specimens to different institutions. So far as known, no satisfactory explanation of the nature of these impressions had been given up to this time; but as the sandstones in which they occur belong to the Chemung group, it is impossible that they can have had anything like the origin popularly assigned to them.

At the house of Mr. Cowles a small slab was seen, which had been obtained at Randolph, or South Valley, Cattaraugus county, bearing impressions of small size, but too indistinct to afford means for determining their true nature; but on visiting Salamanca in company with Mr. Cowles, large numbers of them were found, and in a good degree of perfection. On examining them, on the ground, the fact that any one had been led to consider them as genuine horse tracks, did not appear at all astonishing. An area of several acres in extent, from which the forest had been recently cut, and the refuse material burned, was thickly strewn with large blocks of a clean-grained, heavy-bedded, quartzose sandstone, remarkably free from calcareous matter, and in most parts of a fine-grained texture, but occasionally passing into a coarse conglomerate, containing quartz pebbles of half an inch or more in diameter, and being apparently a continuation of the conglomerate beds which form the so-called "rock city," about four miles in a northerly direction from this place. The surfaces of these blocks were thickly covered with these impressions or "horse-tracks," varying in size from a little more than one inch to full nine inches in diameter, and, at first sight, so astonishingly like the impression left in soft mud or sand by the unshod foot of a horse, as to fully excuse almost any amount of credulity on the part of the ordinary observer. On close examination, however, the resemblance soon disappears, from the many points of dissimilarity which can be detected; such as the great height of the protuberance representing that which would be formed by the hollow of the foot, and the perfectly rounded margin of the cavity, like what would be left by the removal of a rounded, crescent-shaped body.

In examining a number of these tracks, several were observed where the substance forming them had been imbedded vertically in the strata, leaving a cavity representing a transverse section of the body removed, as shown in the accompanying wood-cut. The long diameter of this cavity was about six inches; the distance across the widest part of the bulb a little more than two inches, while the distance across the neck was less than half an inch, the depth of the cavity over three inches, and the larger portion extending beneath forming the segment of a circle; showing very conclusively that the body forming the cavity consisted of a thickened, rounded rim, having a thinner membrane occupying the intermediate space. Another specimen observed had been imbedded obliquely, and preserved the cavity representing a greater part of the disc. In this case the depressions on the sides of the disc had been very deep, allowing the rock to approach within about a fourth of an inch in the center.



From the evidences furnished by specimens of this character, the conclusion was drawn that the impressions had been formed by the tuberous root of a marine plant; and on searching over the surfaces of the blocks some were found that were quite thickly covered with impressions of a reed-like plant, which, although much injured and defaced from the action of fire and weathering, were still distinct enough to place beyond doubt their vegetable origin. On other blocks were found the same plant-stems passing vertically into the sandstone.

Believing, from the foregoing facts, that these bodies are of vegetable origin, the generic name HIPPODOPHYCUS is proposed for them, in allusion to the peculiar impressions left by their removal.

HIPPODOPHYCUS *nov. gen.*

[HIPPODOPHYCUS n. g., in abstract of this paper distributed in August, 1869.]

Marine plants, having swelling roots, which are laterally expanded in the form of a subcircular disc, with one edge truncate, and having the upper and lower surfaces deeply impressed; leaving a thickened, rounded rim to form the margin of the disc, except on the truncate portion, where the substance becomes thin and attenuated, and the central depression opens out to the margin.

The bodies for which the above generic name is proposed are known only from their impressions left on the surfaces of the layers of sandstone where they occur. The cavities are of the form of that which a ball of putty or other soft substance would assume, if pressed between the thumb and finger so as to compress the center and one margin, leaving a rounded rim on three sides of the disc so formed, the compressed margin being truncate, and the extremities of the rim being also laterally compressed. The cavities are mostly placed horizontally in the rock; and, as they occur on the surface of the layer, only one side of the cavity is presented, the other portion having been removed by the displacement of the upper layer of rock, or perhaps by a shaly or softer parting layer. The junction of the stem and rootlets with the disc has, most likely, been at the thin edge of the disc, as there is a kind of cicatrix observed on some of the impressions at this point. The surface of the impression is roughened and sometimes corrugated, as would be natural to the surface of a root; but usually all surface characters have been obliterated by the action of fire in burning off the timber from the field in which they occur, and also somewhat by subsequent weathering.

The impressions occur on a thick layer of sandstone conglomerate, found in many places in Cattaraugus county, New York. There are associated in the same beds two species of PTERINEA, one AVICULOPECTEN, one EDMONDIA, a SANGUINOLITES, and one or two other undetermined lamellibranchiate shells; one SPIRIFER, apparently *Sp. Verneuili* of the New York Chemung rocks, and an undetermined RHYNCHONELLA (*R. Stephani?*). The impressions are found at Salamanca, Randolph and South Valley, Cattaraugus county, New York. Some of those of the latter locality are smaller and of a little different form, and are known by the name of "elk tracks." Both forms are also said to occur in a sandstone of similar character at Quaker Hill, north of Warren village, Warren county, Pennsylvania.

We propose to compliment the Rev. Sylvester Cowles, the original discoverer, who has taken much pains in bringing to light these peculiar forms, and in endeavors to ascertain their true nature, by naming the Salamanca species *Hyppodophycus Cowlesi.*

A very fine slab of the sandstone, measuring three feet by four, and bearing on its surface twenty-two of the impressions, has been received at the State Museum, and placed on exhibition on the outside of the Hall on State street.

The following paper, from p. 205 to p. 224 inclusive, is a republication of species described and published in 1866, except the first four species of crinoidea mentioned in the foot note on page 205, which were first published in 1871. All the other species should have been cited as published in 1866, but owing to the absence of the author during the printing, they are erroneously indicated as *n. sp.* in the present republication.

DESCRIPTION OF NEW SPECIES OF CRINOIDEA AND OTHER FOSSILS

FROM

STRATA OF THE AGE OF THE HUDSON-RIVER GROUP AND TRENTON LIMESTONE.*

By JAMES HALL.

SEVERAL years since, I received from Mr. J. Kelly O'Neall, of Lebanon, Ohio, a new and interesting species of GLYPTOCRINUS from the shales of the age of the Hudson-river group at that place, with a request that I would describe it. Subsequently he sent to me, together with other fossils, a species of HETEROCRINUS and an interesting form of POTERIOCRINUS, from the same formation. I have also had in my possession for some years other undescribed species from the neighborhood of Cincinnati; one of them a peculiar form of HETEROCRINUS (*H. polyxo*), of which I have received a specimen from Prof. W. H. Thomas, one from Mr. S. T. Carley, and have been permitted to examine a very interesting one in the collection of Mr. U. P. James.

I have likewise received a few interesting specimens of other forms from Mr. C. B. Dyer, of Cincinnati, and I am indebted to the liberality of Mr. David Christy, formerly of Oxford, Ohio, for undescribed species. To these have been added some others which have remained for a long time undescribed among my collections. I have also noticed in their proper relation several congeneric forms which have been previously described from the same formations.

This paper was originally prepared for the twentieth report on the State Cabinet. Advance sheets of it were printed and distributed in November, 1866, but it not being possible to complete the plates to illustrate it in season for the printing of the report, its republication has been delayed until the present time.

In October, 1871, additional copies of the paper were distributed in connection with the paper following it in this report, entitled "New Species of Fossils from the Hudson-river Group in the Vicinity of Cincinnati, Ohio,"—the two constituting a single pamphlet.

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* This paper was originally published in November, 1866, as advance sheets of the Twentieth Report on the New York State Cabinet of Natural History. In the present publication, there have been added descriptions of *Glyptocrinus parvus*, *Poteriocrinus posticus*, *Heterocrinus constrictus*, *H. laxus* and *Proetus parviusculus:* of these, figures with their explanations were given in a reissue of the paper in October, 1871. There have also been added diagrams (1-3) illustrative of the genera GLYPTOCRINUS and GLYPTASTER.

Genus — GLYPTOCRINUS* *Hall.*

GLYPTOCRINUS NEALLI *n. sp.*

PLATE 5, figs. 18, 19.

Calyx turbinate, gradually spreading from the base to the free arms; deeply pentalobate below the third radial plates, from the depression of the interradial area; ten-lobed above from the depression of the intersupraradial areas.

Basal plates very small, presenting a low triangular face on the exterior, with very slightly truncated lateral angles. Subradial plates larger, heptagonal, with height and width about equal; the upper extremities truncated by the interradial and anal plates. Primary radial plates subequal in size, the first and third having a general pentangular form and the second quadrangular. Supraradial series consisting of fourteen to sixteen plates (sometimes less), large in the lower part, becoming gradually smaller above, the upper ones about five times as wide as high; the lower larger plates attached to the calyx and dome by the intersupraradial and summit plates, while the upper smaller plates are free and bear tentacula. Interradial and anal plates very numerous; those of the middle range, passing from the subradial plate upward, are largest; the plates between these and the ray are small, some of them minute. In the anal area the number of plates is from fifty to sixty; in the interradial series, from forty to fifty; and in the intersupraradial areas, twenty or more.

FIG. 1.

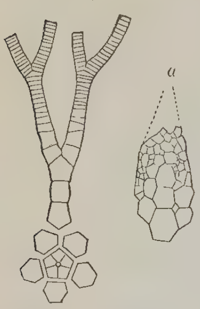

Diagram of *Glyptocrinus Nealli*, showing the basal and subradial plates, together with those of the ray to beyond the first bifurcation of the arms. *a* represents the size and arrangement of the plates of the anal area.

Arms composed of a single series of very short plates, higher on one side than on the other, and bearing tentacula on the longest sides only: tentacula long and slender.

Surface of radial plates marked by an elevated rounded ridge, which bifurcates on the first and third radials, the branches passing to the subradials and thence to the basal plates. No other surface-marking seems to have existed, except the appearance of a finely granulose texture.

This species differs from *G. decadactylus* of the same geological

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*For observations on the relations of GLYPTOCRINUS and GLYPTASTER, see *Transactions of the Albany Institute*, Vol. iv.

formation, in the depressed anal, interradial and intersupraradial areas, and in the smaller and more numerous plates of these areas, which are also destitute of the stellate ridges which characterize those of that species. It also differs in having the arms becoming free and composed of small tentacula-bearing plates below the second bifurcation of the ray, although possessing the same number of arms.

In *G. decadactylus* the body is more robust and gibbous, the interradial spaces are not depressed, and the plates are marked by radiating ridges; the calyx extends above the second bifurcation of the ray, and the arms become free only above that point.

Formation and locality. In shales of the Hudson-river group, near Lebanon, Ohio From Mr. J. Kelly O'Neall.

Fig. 2.

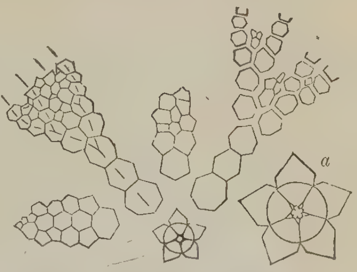

Diagram illustrating the structure of *G. decadactylus* showing that the basal plates are reduced to the smallest possible size. The plates of the ray to beyond the second bifurcation are all polygonal, and present a strong contrast to the corresponding portions of *G. Nealli*. *a* represents the basal and subradial plates enlarged to two diameters to show the minute basals.

Fig. 3,

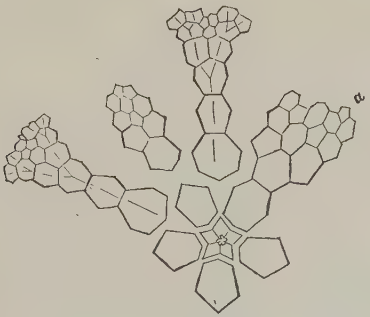

Diagram of Glyptaster (*inornatus*) from the Niagara group, introduced to show the differences between this and the genus Glyptocrinus. In this diagram the basal plates are seen to be of much larger size, and are visible beyond the circumference of the column; while the anal area *a* is larger than the interradial series, and is composed of a greater number of plates, the lower one of which truncates the subradial; while in the latter genus the areas are all similar to each other, and vary but slightly in the number and arrangements of the plates composing them.

GLYPTOCRINUS PARVUS *n. sp.*

PLATE 5, fig. 17.

Body small, narrow, turbinate to the bases of the free arms. Subradial (basal) plates about equal in height and width; the plates of the radial series sub-equal, the first ones a little the largest. Rays dividing on the third radial plate, and again on the second supraradial, above which the plates are smaller and soon become free, forming the bases of the arms. Interradial series, consisting of six or more plates, varying from pentagonal to heptagonal. Intersupraradials, one, two or more.

Arms long, slender, composed of a single series of short, slightly wedge-form plates, supporting tentacula on the sides of the alternating plates; tentacula long and comparatively strong.

Surface of plates smooth; the center of those composing the rays strongly elevated, forming a strong round ridge along the ray to the arms.

This small specimen bears very close resemblance to *G. decadactylus* Hall, and may possibly prove to be the young of that species. In its present condition it is not so broadly turbinate as the young individuals heretofore seen of that species.

Formation and locality. In rocks of the Hudson-river group at Cincinnati, Ohio.

Genus—POTERIOCRINUS *Miller.*

Subgenus—**Dendrocrinus** *Hall.*

Poteriocrinus (Dendrocrinus) caduceus *n. sp.*

Plate 5, figs. 7, 8.

Calyx of medium size, regularly turbinate, lobed at the arm-bases by the projection of the upper part of the first radial plates.

Basal plates elongate, pentagonal, the upper ends very obtusely wedge-form. Subradial plates higher than wide, four hexagonal and one heptagonal. First radial plates wider than high, the upper margins deeply excavated for the reception of the first arm plate. Anal series consisting of one large hexagonal plate resting upon the upper end of the heptagonal subradial plate, supporting other smaller plates above; three ranges are visible in one individual, the central range largest and gradually diminishing in size upward; twenty-four or twenty-five plates can be counted in direct succession; they are hexagonal, with an elevated ridge along the middle of the range.

Surface of body plates obscurely marked by radiating ridges, which are more distinct near the sutures where they unite with those from the adjoining plates; the lateral edges of each plate are marked by two or three of these ridges, while the other margins have one each.

Arms composed of a single series of short plates, and frequently bifurcating, the first division on the sixth above the first radial plate. The arms are of moderate size at their origin, rapidly diminishing at each bifurcation. The arm plates are smooth on the back; the upper lateral margins somewhat projecting for the attachment of the tentacula.

Column proportionally slender, obscurely pentangular, composed of equal joints below, becoming more unequal near the junction with the calyx.

This species approaches more nearly to *P. alternatus* of the Trenton limestone of New York than to any other described form; but it differs in having more elongate body plates; the arm plates are not compressed laterally, and the column is much smaller and composed of equal joints, while in that species the joints are very unequal.

Formation and locality. In shales of the Hudson-river group, at Lebanon, Ohio. From Mr. J. Kelly O'Neall.

Poteriocrinus posticus *n. sp.*

Plate 5, figs. 5, 6.

Body small or of medium size, narrowly turbinate to near the origin of the free arms. Basal plates small, a little wider than high, obtusely wedge-form on the upper end. Subradials, about twice the size of the basals, somewhat regularly hexagonal, except the one on the anal side, which is larger and heptagonal. First radials a little wider than the subradials and not so high; all the radial plates a little wider than high. Anterior ray dividing on the seventh radial plate, the other on the sixth radial; divisions of the rays, above the primary division, occurring at irregular distances, moderately diverging and rapidly decreasing in size; the number of bifurcations cannot be determined from the specimen under examination. Arm plates, as far as seen, rather shorter than wide, equal sided.

Anal area large; first anal plate largest, pentangular or heptagonal, resting upon the larger subradial, and supporting two or three plates on its upper edges, above which rises the strong, broad proboscis, which is composed of eight ranges of hexagonal plates, decreasing in size regularly from below upwards, and marked by elevated ridges passing to those of the adjacent ranges.

Surface of plates smooth.

The most conspicuous feature in this species is the broad anal area surmounting the large subradial plate.

Formation and locality. In rocks of the Hudson-river group, Cincinnati, Ohio. From Mr. C. B. Dyer.

Genus — HETEROCRINUS *Hall.*

This genus, originally described in the first volume of the Palæontology of New York, is there represented as being destitute of basal plates. This is true of many specimens examined, and of most of the species in their ordinary condition. Some of them, however, do present small points or nodes at the summit of the column, alternating with the subradial (described as basal) plates; and these should undoubtedly be regarded as basal plates. Other specimens show the existence of minute basal plates on the removal of the column, proving that these parts of the calyx exist in an undeveloped condition.

Were the basal plates developed, the structure of the calyx would be the same as in POTERIOCRINUS; and in the absence of these plates, those which are the subradials in that genus become the basal or lower series, resting directly upon the column in the forms referred to HETEROCRINUS. Since we have acquired farther knowledge of the structure and mode of growth in Crinoidea, we have become acquainted with similar conditions in other genera, particularly of Lower and Upper Silurian forms. It may become a question of some interest, whether species or genera, where the absence of certain parts may be presumed due to non-development, or want of external development, shall be entitled to rank as genera on that account.

HETEROCRINUS CONSTRICTUS *n. sp.*

PLATE 5, figs. 13, 14.

Body and arms somewhat above the medium size, robust, expanding gradually from the basal plates to the top of the second radials of the principal rays, and more abruptly from below the origin of the arms, giving a constricted appearance to the fossil at that point. Basal plates very low, not more than half as high as the width.

In three of the rays—the anterior, left antero-lateral and right postero-lateral—the bifurcation takes place on the third plate; the first and second plates are quadrangular, and of nearly equal height and width; the third is short pentangular, and directed outward from the plane of the plates below. In the right antero-lateral ray, the bifurcation takes place on the fourth radial plate, the constriction at the top of the third, and the plates broader than high. In the left postero-lateral ray the bifurcation is on the fifth radial, and the constriction still at the top of the third, the fourth plate being very short. Arms above the bifurcation strong, composed of a single row of wedge-form plates, every third one of which, on alternate sides, or every sixth one on the same side, bears a short, thick armlet, which is composed of quadrangular plates.

Anal plates, only one visible in the specimen which is used for description; this rests upon the side of the second radial plate of the adjoining ray, and is irregularly pentangular and of medium size.

Surface of body-plates smooth; those of the arms irregularly constricted, and somewhat zig-zag in arrangement.

This species is distinguished from *H. simplex* Hall, by the structure of the body, the constriction below the origin of the free arms, and in having the armlets rising only from every third plate, while in *H. simplex* they rise from every second plate on opposite sides, or every fourth plate on the same side.

Formation and locality. In the limestones of the Hudson-river group, at Cincinnati, Ohio. From Mr. C. B. Dyer.

HETEROCRINUS LAXUS *n. sp.*

PLATE 5, fig. 15.

Body small, with long, comparatively stout, flexuous arms, which give origin to strong armlets at regular distances on the opposite sides. Calyx turbinate, strongly pentalobate in the upper part, but little higher than the width of the upper margin. Basal plates proportionally large, pentangular, width and height equal. First radial plates higher than wide, the others of equal proportions, or wider than high; the adjacent margins united to the top of the second radials in the anterior and left antero-lateral rays, and to the top of the third in the other rays, thus forming the calyx; above this point they become free.

The bifurcation of the rays takes place on the fifth and sixth plate above the basals; beyond this point there are no true bifurcations, the arms giving support to strong armlets on every fourth plate on the opposite sides, or every eighth plate on the same side. Arm plates quadrangular, height and width nearly equal. Armlet plates long, quadrangular.

There are indications at several points that the armlets also bifurcate at about the sixth or seventh plate.

Anal plates, two visible in the specimen; narrow, elongate, the lower one resting upon the side of the second radial plate of the adjacent rays.

Surface of plates smooth or granulose.

This is easily distinguished from the other species by the pentalobate calyx, the serpentine direction of the arms, and the greater number of plates between the armlets.

Formation and locality. In the rocks of the Hudson-river group, at Cincinnati, Ohio. From Mr. C. B. Dyer.

HETEROCRINUS JUVENIS *n. sp.*

PLATE 5, figs. 9, 10.

Body minute, the greatest diameter of the cup not exceeding a line, and the height from the base to the top of the first arm plates a line and a half.

Basal plates appearing only as triangular points at the lower lateral angles of the adjacent subradials. Subradial plates wider than high, hexagonal. Three of the first radial plates higher than wide, each supporting a single smaller arm plate, which presents the appearance of having had another plate above; the other two radial plates are short, quadrangular; one of them supporting a small plate above, and the other one a wedge-form plate, upon which rest two other small plates, one larger than the other; the largest of these has the position and appearance of an anal plate.

Surface of plates smooth.

Column distinctly pentangular, nearly as large as the diameter of calyx, composed of alternating thick and thin plates.

This crinoid may be only the young of some previously described species; but as there have been several individuals found, all presenting the same characters and of about the same size, I have thought proper to designate it as a distinct species for the present.

Formation and locality. In shales of the Hudson-river group, at Lebanon, Ohio. From Mr. J. Kelly O'Neall.

HETEROCRINUS ? (IOCRINUS) POLYXO *n. sp.*

PLATE 5, figs. 1–4.

Calyx short, broadly turbinate and strongly pentalobate, consisting of only two ranges of visible plates.

Basal plates undeveloped and entirely concealed by the column; sometimes seen on its removal in large individuals. Subradial plates very short, their lateral margins reaching but little above the base, strongly wedge-form above. Radial plates wider than high; nearly the entire width of the upper margin occupied by the cicatrix for the attachment of the arm. No anal plates have yet been observed in any of the individuals examined.

Arms long and slender, with frequent bifurcations; composed in the lower part of short plates, the upper margins of which project beyond the base of the next succeeding plate; in the upper part, the arms are proportionally narrower and somewhat carinate on the back. The first division of the arms takes place on the second radial plate in one ray, on the sixth plate in another, and in the other three rays on the fifth plate; above this the arms divide four or five times, becoming very slender toward their extremities.

The calyx plates are deeply impressed at their lateral margins, giving the strongly pentalobate character, The first radial plates have also a strong elevated ridge passing across the lateral sutures from plate to plate; this is nearly as high as the center of the plate. In well-preserved specimens there is a small node at the lower lateral angles of the first radial plates, and a corresponding node at the upper extremity of the subradial plates. No other surface markings have been observed.

Column of medium strength, strongly pentangular or obsoletely pentalobate, composed of alternating thick and thin plates of two or more sizes; the angles of the thick plates subnodose. At and near the junction with the calyx, the column sometimes becomes deeply pentalobate.

This is a distinct and strongly marked species, and is readily distinguished from other forms by its deeply pentalobate calyx, and the extremely rugose character of the arms, caused by the projection of the upper margins of the short quadrangular plates.

Formation and locality. In shales of the Hudson-river group, at Cincinnati, Ohio.

HETEROCRINUS EXILIS *n. sp.*

PLATE 5, fig. 16.

Body small, with long slender arms; calyx turbinate.

Basal plates minute, appearing only as the upper joint of the column. Subradial plates hexagonal; height and width subequal. Radial plates varying in number in the different rays, and bifurcating at different distances above their origin; the postero-lateral rays bifurcate on the second radial plates; the antero-lateral rays bifurcate on the fourth, and the anterior ray apparently on the sixth plate. Anal plates not observed.

Arms bifurcating once or twice; plates of the arms long and slender, the upper margins projecting, furnished with proportionally long and slender tentacula.

Surface of plates smooth and having only the general curvature of the body, except in the basal series, where each forms a small node below the junction of the adjoining subradial plates.

Column pentangular near its junction with the body, but more distinctly rounded below; composed of alternating thick and thin joints.

This is a small gracefully formed species; it differs from the *H. simplex* (= H. canadensis *Billings*, Decade iv, *Canadian Organic Remains*, Pl. iv, f. 5) of the same locality, in size, in the structure of the calyx, and in the form and structure of the arms.

Formation and locality. Hudson-river shales, Cincinnati, Ohio. From Mr. W. H. Thomas.

Genus — AGELACRINUS *Vanuxem.*

Agelacrinus [Lepidodiscus] Cincinnatiensis *Rœm.*

F. Rœmer, Verh. Naturh. ver. für Rheinl. und Westph., Vol. viii, p. 372, t. 2, figs. 3*a*, *b*. 1851. Bronn's Lethea Geog. Vol. ii, pp. 275–277, t. 4, fig. 6.

Plate 2, fig. 7.

This species, described by Rœmer, is from the Lower Silurian shales of the age of the Hudson-river group at Cincinnati.

It has a moderately convex disc, usually with a diameter of one-half to three-fourths of an inch, though it sometimes reaches a diameter of nearly one inch, which is about the size of the one figured by Dr. Rœmer. The smallest specimen identified with this species has a diameter of less than one-fourth of an inch.

The disc is composed of numerous imbricating scale-like plates, the rays all curving, four sinistral and one dextral, the interradial areas composed of large plates; the mouth, anal or ovarian aperture, situated subcentrally in the largest area and enclosed between the dextral and one of the sinistral rays, and surrounded by a pyramid of small triangular plates.

This species is more commonly found adhering to the valves of *Strophomena alternata*, though it sometimes occurs attached to the shell of *Modiolopsis* and to coralline masses.

Agelacrinus pileus *n. sp.*

Plate 2, figs. 8–10.

Body subglobose or globular bell-shaped, attached by the smaller extremity, which is composed of small squamiform plates. Rays rising from the top of the dome, and curving gently down the sides: four sinistral and one dextral; the dextral and one sinistral surround the posterior interradial space. The rays are formed of two ranges of lanceolate plates, their ends pointed and interlocking over the arm-grooves; their bases originating in a transverse pyramid formed by the union of two bifurcating or V-shaped plates, one on each side of the base of the anterior ray, and a single shield-shaped plate which is situated at the upper extremity of the posterior interradial area. The extremities of the rays appear to have been subsessile. The lateral arms originate in pairs, the anterior arm being separated from them by the V-shaped plates.

Interradial areas distinct, the posterior one quite large, and composed of numerous very small plates. Ovarian aperture situated subcentrally in the largest interradial area.

This species, in specimens flattened from above, might readily be mistaken for *A. Cincinnatiensis* Rœmer; but on comparison, it will be found to have a proportionally larger posterior interradial area composed of smaller plates; and in the other areas, the plates bordering the arm-grooves are proportionally longer and of a different form. When the specimens have been crushed or flattened vertically, the body is found to overlap the basal margin of the disc.

In its normal condition, the specimen has been about half an inch in diameter.

Formation and locality. In shales of the Hudson-river group, at Cincinnati, Ohio.

AGELACRINUS VORTICELLATUS *n. sp.*

PLATE 6, figs. 11–13.

Body discoid, depressed-convex on the upper surface; attached by the under surface to foreign bodies.

Marginal portion of the disc composed of several ranges of minute squamiform plates: inner portion of the disc occupied by five elevated, sinistrally curved and closely coiled rays or arm-grooves, the curvature of each ray making about one-fourth of a volution. Rays composed of a double row of lanceolate-spatulate plates, which interlock at their upper ends to cover the arm-grooves. The plates forming the outer curvature of the ray are longest, and inclined at a lower angle than those of the inner side. The inner ends of the rays terminate in a solid pyramid formed by the union of the two bifurcating or V-shaped plates and one shield-shaped plate.

Interradial areas very small, hardly perceptible. Ovarian aperture minute, situated near the bases of the postero-lateral rays.

This species is easily distinguished from the others of this formation by having the arms all curved in one direction, and by being almost destitute of interradial areas.

The specimen described is less than half an inch in diameter.

Formation and locality. In shales of the Hudson-river group, Cincinnati, Ohio.

AGELACRINUS (HEMICYSTITES) STELLATUS *n. sp.*

PLATE 6, figs. 5, 6.

Body small, subdiscoid, sides of the disc rising nearly vertically from the place of attachment; composed of very minute squamiform plates. Rays straight, broad at base, narrowing toward the outer extremities, which are obtusely rounded; composed of proportionally large plates.

Interbrachial areas distinct. Ovarian aperture situated centrally in the largest area.

This species is represented by two individuals, the largest of which is very entire, and presents all the parts in a very satisfactory condition. The perfectly straight rays are peculiar, and do not admit of the probability of its being the young of any of the forms with curved rays; since young specimens of *Agelacrinus Cincinnatiensis* of but little larger growth have the rays distinctly curved.

This form is similar to the *Hemicystites parasiticus* of the Niagara group, having the sides more abruptly elevated than the ordinary forms of AGELACRINUS, while the rays are straight and prominent. In consideration of these and other characters mentioned, I designated the Niagara species under the name HEMICYSTITES, while Dr. Rœmer and others following him, have placed the same under AGELACRINUS. I am, nevertheless, disposed to regard such forms as generically distinct.

Formation and locality. In shales of the Hudson-river group, Cincinnati, Ohio. Parasitic on *Strophomena alternata.*

Genus — LICHENOCRINUS *nov. gen.*

Bodies parasitic on shells and other foreign substances. Form discoid or depressed-convex, with a proboscidiform appendage rising from the center. Disc composed of an indefinite number of polygonal plates, and apparently having no distinct mode of arrangement. Proboscis perforate, and in the known species formed of five ranges of short plates alternating and interlocking at their margins.

The fossils for which this generic name is proposed are small parasitic scab-like bodies, usually found adhering to the smooth surfaces of shells and other foreign substances.

The two species now known are from the shales of the Hudson-river group in the neighborhood of Cincinnati, Ohio.

LICHENOCRINUS DYERI *n. sp.*

PLATE 7, figs. 1–6.

Body small, discoid, depressed in the middle, with five slight elevations midway between the center and the edge of the disc. Proboscis strong, composed of short plates. Disc composed of very small polygonal plates. Surface smooth.

Formation and locality. Hudson-river group, at Cincinnati, Ohio; attached to the inner surface of worn valves of shells. From Mr. C. B. Dyer.

LICHENOCRINUS CRATERIFORMIS *n. sp.*

PLATE 7, fig. 7.

Body small, distinctly subpentagonal, subdiscoid, with an elevated margin and strongly depressed center; composed of medium-sized polygonal plates. Proboscis minute, central.

This species differs from the preceding in its more elevated margin, and in the absence of the five prominences of the disc; the proboscis is much smaller in proportion to the size of the body, and the whole is composed of a smaller number of larger sized plates.

Formation and locality. In shales of the Hudson-river group; Oxford, Ohio.

Genus—CYCLOCYSTOIDES *Billings & Salter.*

In the descriptions of fossils accompanying the Report on the Lake Superior Land District,* I noticed, without designating by name, a peculiar crinoidean or cystidean body, of which the specimen preserved showed simply a circular range of small plates, joining each other by their lateral faces. No further notice of this or other similar bodies was given till the publication of the Third Decade of the Organic Remains of Canada, in 1858, where Messrs. Salter and Billings have described two similar forms under the generic name CYCLOCYSTOIDES, as follows:

> " *Generic characters.* Discoid, surfaces formed of an integument composed of numerous small granular plates, which appear to be radiately arranged; margin entirely surrounded by thick subquadrate plates, each of which presents upon its outer half, two deep obtusely oval excavations. These, in perfect specimens, are covered over by minute polygonal plates, thus forming a tubular channel around the whole animal. This channel appears to have been connected with the interior by small pores, penetrating through the marginal plates, there being one pore leading from each of the excavations. The margin or (perhaps) disc was also connected with a long tube, like the proboscis of some of the Crinoids, formed of many small polygonal plates." [Can. Org. Rem., Decade iii, p. 86. 1858.]

A specimen of this genus from the Trenton limestone of Saratoga county differs from any described, and in some respects does not correspond with the generic description given above. The specimen is not quite circular, but is subovate and obscurely pentagonal, with twenty-six submarginal plates, outside of which are two ranges of plates, and surrounding these is a granulose or subreticulate border. The portion outside of the circle of large plates appears to be entire, but there is no evidence of the concentric "tube" described as characteristic of the genus; nor does there appear to have been any place for such a tube, which, it will be observed from the illustrations (loc. cit.), has not been seen in place by the authors of the genus, but is represented as lying separated on the same slab or stone with the fossil described.

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* Foster & Whitney's Report on the Lake Superior Land District, p. 209, pl. xxv, fig. 4 *a-c*. 1851.

The enlarged figure has the aspect of a crinoidean proboscis, and is represented as a cylindrical tube. In the ideal section (fig. 10, pl. x, bis. loc. cit.), this tube is represented as an archway bordering the ossicula or larger plates, and extending over the smaller excavated plates. It seems to me that if the appendage be a cylindrical tube it could not have found attachment to the border, and if an arch of small plates, as represented in fig. 10, we should find some evidence of a cicatrix for its attachment. Neither the specimen now under consideration, nor the one from the Escanaba river, show any evidence of this marginal tube, nor does the structure, so far as I can discover, require any such exceptional development.

Cyclocystoides Salteri *n. sp.*

Plate 6, fig. 16.

Body discoid, subovate and obtusely pentagonal, with a prominent circle of quadrangular plates, which are a little longer than wide, and somewhat contracted or sloping and striate at the ends, with granulose surface. Within this range of plates the disc is thin, submembranaceous in appearance, and composed of small plates which are arranged in radiating order representing the ambulacra.

The center has apparently been composed of a pyramid of minute plates with five depressions surrounding it, from each of which proceed two diverging rays, composed of double ranges of pores which extend to the ring of larger plates or ossicula. Between each pair of rays there is an intermediate shorter ray of similar character. Between the rays which are directed to the broader extremity, there is an oval opening, which may represent the oral aperture. The space between these rays is wider than between any of the others, giving room for this feature.

The entire interior portion of the disc presents a delicate reticulate structure.

The border outside of the ring of larger plates consists first, of a range of small plates which are elevated in the center and at the margin with an intermediate space depressed. There are from two to three of these plates to one of the larger ones. Bordering these there is a range of submarginal scale-like plates, arranged in pairs, which are closely anchylosed, there being one pair of these to each of those just described: the anchylosed edges are distinctly depressed, while the exterior margins are prominent. Surrounding the whole there is a narrow granulose (shagreen) border which is entire on its outer margin.

This body thus constituted seems to resemble the Echinidæ of succeeding geological periods more than the Crinoidea, Cystidæ or Asteridæ of the Palæozoic formation, and in the minutiæ of its structure becomes an object of interest.

The specimens which I have observed do not appear to have been parasitic; and no indication of such a character is given by the authors of the genus. From the manner of their occurrence I consider them to have been floating bodies; the disc composing the solid portions of the animal, and from which may have depended a fleshy or cartilaginous sac.

Formation and locality. In a soft shaly seam in the Trenton limestone, near Saratoga, New York.

CYCLOCYSTOIDES ANTECEPTUS *n. sp.*

The specimen consists of a subovate ring of strong plates, which are narrow on their inner faces, or somewhat wedge-form, the transverse diameter the greater, and the height greater than the length. Their surfaces are strongly granulose, separated at the sutures as for the intervention of muscular attachments.

The marginal plates have been removed, and nothing is known of the character of the disc.

Formation and locality. In the upper part of the Trenton limestone, or base of the Hudson-river group, on the Escanaba river, in Michigan.

Genus — CRANIA *Retzius.*

CRANIA TRENTONENSIS *n. sp.*

PLATE 7, figs. 11, 12.

Shell of medium size, strongly convex on the upper valve; width a little greater than the length, greatest width below the middle of the shell. Beak of dorsal valve small, pointed towards, and situated near, the cardinal border.

Surface marked by strong concentric lines of growth. No striæ or radiating lines are visible. Transverse diameter eleven-twentieths of an inch; length half an inch.

This species bears considerable resemblance to *C. Hamiltonensis* in its general form and in surface characters, but differs in having the beak so near the cardinal border.

Formation and locality. In Trenton limestone, Middleville, New York.

Crania setigera *n. sp.*

Plate 7, figs. 13, 14.

Shell small, suborbicular; length greater than width; cardinal margin nearly straight. Dorsal valve convex; beak elevated, pointed, situated nearly one-third the length of the valve from the cardinal border.

Surface marked by comparatively coarse pustules or setæ, which are more distant near the margin of the shell.

The surface-structure and the prominent pointed beak are sufficiently characteristic to distinguish this species from any other form of the genus found in the rocks of this age.

Formation and locality. In limestones of the period of the Trenton limestone, near Mineral Point, Wisconsin.

Crania scabiosa *n. sp.*

Plate 7, fig. 15.

Shell somewhat less than medium size, usually discoid or little elevated, but sometimes prominent, irregular in outline; margin thickened. Apex of dorsal valve eccentric, varying in different individuals. Surface of valve having usually strong lamellose lines of growth, which are sometimes obscured by the roughness of the substance to which the specimen is attached, showing through the shell or causing it to grow irregularly, by which it often assumes the features of the foreign body. Ventral valve unknown.

This species is not uncommon; usually found attached to shells of other Brachiopoda, and sometimes on Chætetes and other substances. The valves of *Orthis lynx*, *Orthis occidentalis* and *Streptorhynchus planumbona* are often found with several individuals so crowded together as to give quite an irregular outline to the specimens.

Formation and localities. In the Hudson-river group, at Cincinnati, Oxford and Lebanon, Ohio; also on the banks of the Ohio river opposite Westport, Kentucky.

Crania Lælia *n. sp.*

Plate 7, fig. 16.

Shell small, discoid or moderately convex on the upper valve, somewhat narrowed towards the cardinal border. Apex of the dorsal valve minute, not prominent, situated about one-third the length of the valve from the cardinal margin.

Surface marked by fine but very sharply elevated radiating striæ, which are sometimes tortuous, and frequently increased by implantation. Ventral valve and interiors not observed.

This is a distinct and well marked species, not easily to be mistaken for any other now known to me. Its nearest analogue is *C. crenistria* of the Hamilton group; but the striæ are sharper, with the apex more appressed, and somewhat differently situated.

Formation and locality. In rocks of the Hudson-river group, Oxford, Ohio. From Mr. David Christy.

Genus — PHOLIDOPS *Hall.*

Pholidops Trentonensis *n. sp.*

Plate 7, fig. 8.

Shell small, broadly oval, very depressed-convex. Apex situated near the cardinal extremity. Surface marked by strong concentric lamellose lines of growth.

This shell is larger than any other described species, except the *P. terminalis* from the Oriskany sandstone, at Cumberland, Md., and differs from all the others in the regularity of the oval outline, and the proximity of the apex to the cardinal margin. The specimens which I have seen do not appear to have the surface so closely marked with squamose lines as most of the other forms.

Formation and locality. Found on the surfaces of slabs of Trenton limestone, from Middleville, New York, associated with *Orthis testudinaria.*

Pholidops subtruncatus.

Plate 7, fig. 9.

Orbicula? subtruncata: Hall, Palæontology of New York, Vol. i, p. 290, pl. 79, figs. 7*a*, 7*b*.

This species, on examination, proves to be a Pholidops, and distinguished from all the others by its wide and subtruncate posterior border.

The original is from the shales of the Hudson-river group, at Lorraine, Jefferson county, New York.

We have therefore two Lower Silurian species of the genus, now known to range from Lower Silurian to Devonian, inclusive.

Genus — TREMATIS *Sharpe.*

Trematis millepunctata *n. sp.*

Plate 7, figs. 22–25.

Shell small, suborbicular, transverse on the ventral side and lenticular in profile. Ventral valve strongly convex below the middle, more depressed above; with a narrow deeply depressed pedicle-opening, the margins of which are flattened for a space nearly equal to the breadth of the opening. Dorsal valve more elongate, most convex above the middle; the beak pointed and projecting considerably beyond the opposite valve; with a depressed or concave triangular area. Interior of the dorsal valve marked near the middle by two comparatively large semicircular or reniform muscular scars, the breadth across the two more than equal to one-third of the diameter of the valve: the center of the valve has also a slight mesial septum.

Surface strongly punctate in concentric curves passing from the center of the shell outwards, extending through the shell near the front of the valves, and distinctly marking the cast: inner layers of shell not punctate.

Specimens of this species have been sent from Cincinnati, and published and figured as the *T. terminalis* of Emmons. It differs from that species, however, in being more transverse, with a less convexity of the ventral valve and more prominent beak of the dorsal valve; and also in the character of the punctate structure. The Trenton species is distinctly punctured, the puncta passing through the shell, showing most distinctly on partially exfoliated specimens; while in this species they are entirely confined to the exterior layers of the shell. It is also destitute of the radiating striæ always found on *T. terminalis* when the shell is partially exfoliated.

The specimens of this species usually measure about half an inch in length and five-eighths of an inch in width. I have received them from Mr. S. P. Carley, Mr. U. P. James, and other sources.

Formation and locality. In shales of the Hudson-river group, Cincinnati, Ohio.

TREMATIS? PUSTULOSA *n. sp.*

Shell large, subquadrangular, both valves strongly convex; the greatest convexity of the ventral valve at or below the middle; that of the dorsal valve, above the middle. Peduncular opening small, near the cardinal margin. Beak of the dorsal valve not prominent.

Surface marked by concentric wrinkles and fine distant radiating striæ, which are produced in pustules or short spines on the front of the valves, where they cross the concentric lines, and become transverse nodes on the lateral portions of the shell.

In casts, or much exfoliated shells, there are radiating lines, which appear to have been vascular markings.

This species is easily distinguished by its subequally ventricose valves, the quadrate outline, and the peculiar surface-markings.

The length of the specimen is about three-fourths of an inch with a width of a little more than one inch; the depth of the two valves together is about five-eighths of an inch.

Formation and locality. In shales of the Hudson-river group, three miles east of Horicon, Wisconsin.

Genus—DALMANIA *Emmerich.*

Dalmania breviceps *n. sp.*

Plate 8, figs. 15, 16.

Body broadly ovate in general form, having its greatest width across the base of the cephalic shield. Head subcrescentiform, the anterior margin very slightly produced in front of the glabella. Frontal lobe of glabella transversely elliptical, the breadth nearly twice as great as the length, separated from the anterior lobe by deep narrow furrows. Anterior lobe transversely subovate, prominent; middle and posterior lobes obsolete; occipital ring narrow, distinctly defined.

Eyes very prominent, with five lenses in the central vertical range, but the number of vertical ranges cannot be determined; palpebral lobe depressed. The outer border of the movable cheeks is thickened and rounded, and the space between the border and the eye depressed. The posterior spines long and broad, reaching to the sixth thoracic segment.

Thorax with the axial lobe highly convex and the lateral lobes strongly geniculate, subequal in width, rapidly tapering posteriorly from the fourth or fifth segment. Segments curved forward on the top of the axial lobe, and the furrows on the pleura strongly marked.

Pygidium obtusely pointed behind, the lateral borders inclosing an angle of about 120°, the anterior border rounded; the number of articulations not clearly defined, but apparently numbering about ten or twelve, besides the terminal one: those of the lateral lobes have been more numerous.

The entire surface, so far as can be seen on the specimen, has been finely pustulose.

This species differs from all others described, in the short cephalic shield, and in the absence of middle and posterior glabellar lobes. In general form, it resembles *Dalmania callicephala* of the Trenton limestone of New York; but differs conspicuously in having spines on the posterior angles of the cephalic shield.

Formation and locality. In shales of the Hudson-river group, Lebanon, Ohio. From Mr. J. Kelly O'Neall.

Genus—PROETUS *Steininger.*

Proetus parviusculus *n. sp.*

Plate 8, fig. 14.

Body, in general form, broadly ovate, widest across the base of the cephalic shield. Head sublunate, produced into long sharp spines at the posterior angles of the cheeks. Glabella elevated, broadly subconical rounded in front, concave behind; furrows not visible.

Eyes comparatively large and prominent, separated from the glabella by a somewhat deep groove; border of the head broad and flattened.

Thorax having the axial lobe very prominent, narrower than the lateral lobes; segments scarcely arching forwards in the middle; lateral lobes geniculate, and having the extremities of the pleura directed backwards and distinctly furrowed to near their outer extremities.

Pygidium small, semicircular, regularly rounded behind, and the anterior margin straight to near the lateral angles, where it is abruptly curved backwards. Axial lobe narrow, not reaching to the posterior border of the shield; marked by five small annulations, with about the same number on the lateral lobes, which are less distinctly marked.

Surface smooth, or very finely granulose.

This species has no near analogue in any member of the genus hitherto described. It most resembles the *P. sculptus* Barrande, but differs in being destitute of the surface markings and of the furrows on the glabella, and in having ten instead of nine thoracic segments, the extremities of which are pointed backwards, instead of being nearly straight and obtuse as in that species.

Formation and locality. In shales of the Hudson-river group, Cincinnati, Ohio.

DESCRIPTION OF NEW SPECIES OF FOSSILS

FROM THE

HUDSON RIVER GROUP, IN THE VICINITY OF CINCINNATI, OHIO.*

By JAMES HALL.

In November, 1866, some advance sheets of the *Twentieth Report on the State Cabinet of Natural History* were published, containing descriptions of new species of Crinoidea, and other fossils. Owing to the delay in completing the plates for illustrating the paper, it was omitted from its place in the final publication of the Report, an explanation of this fact appearing in the proper place.†

In that paper I published a description of the Genus LICHENOCRINUS from specimens then in my possession. Soon afterwards I received from Mr. C. B. Dyer, of Cincinnati, other specimens, which seemed sufficient to disprove the existence of a proboscis which had been described as characteristic of the genus. In the specimens first described the portions of this appendage preserved were crushed, and not more than half a line in length, consisting of a series of small plates interlocking at their lateral margins after the manner of such organs in other crinoids. In some specimens, under later examination, this appendage has a length of several inches, and in others it is broken off at different distances from the body. It is composed of distinct plates scarcely interlocking at their lateral margins, but assuming the character of a column or stem.

The adhering face of the crinoid, which has been seen in several specimens, presents a striated surface, and is composed of a series of fine radiating lamellæ with narrow interstices. These vertical lamellæ reach to the inner surface of the exterior plates, and the whole presents much the aspect of a shallow cup surrounded by crinoidal plates and filled with a finely radiating coral. We may imagine that the spaces between these lamellæ have been occupied by slender fleshy tentacula. The fossil is usually found adhering by the striated or lamellose face to shells or other organic bodies; and if we suppose this part to have been the place of lodgment of the viscera, it presents a very anomalous condition, and we can scarcely believe that the position in which we find it is the normal one. From the peculiar construction of this disc, it might be suggested that the animal was capable of thus attaching itself temporarily and removing at will.

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* Published October, 1871, as advance sheets of the State Museum Report.
† The paper appears in the present Report, page 205.

We may also suggest another explanation by supposing that the adhering portion with the appendage are the base and column of an unknown crinoid, the discovery of which may set at rest the question concerning its nature. The remarkable striated attached surface without extending fibres or rootlets, and the regular arrangement of the plates upon the other side is so different from ordinary known crinoidal bases as almost to preclude such an idea.

Albany, *September*, 1871.

Genus—LEPTOBULUS *nov. gen.*

λεπτοζ, *minutus and obolus.*

Shell semiphosphatic, fragile, minute, more or less elliptical ovate or subcircular, with moderately (or sometimes more extremely) convex valves, which are concentrically marked on the exterior surface. Ventral valve with a distinct area and pedicel groove; interior with an elevated subquadrate muscular area. Dorsal valve a little thickened on the cardinal margin, with slightly elevated trifid muscular impressions.

There are, in the Utica slate of New York, and in the same horizon in Iowa, and in the shales of the Hudson-river group at and near Cincinnati, numerous minute, apparently phosphatic shells which have usually been referred to Lingula, but without a knowledge of their interior structure. The external form is so similar in all of them that specific discrimination is often scarcely practicable.

Among the specimens received from Mr. C. B. Dyer, are some individuals which show the interior characters in a pretty satisfactory manner. For these forms I propose the generic name Leptobolus.

Leptobolus lepis *n. sp.*

Plate 7, figs. 19, 20.

Shell minute, ovate, or broadly elliptical in outline, about three-fifths as wide as long, and seldom exceeding seven-hundredths of an inch in length; moderately convex, the greatest convexity being about one-third of the length from the beak; ventral area thickened; pedicel groove strongly defined; muscular impression broad, extending more than one-third the length of the valve; muscular ridges of the dorsal valve strongly marked, the central one extending two-thirds the length of the shell, the lateral ones diverging from each other at an angle of about forty-five degrees, and extending nearly to the middle of the valve; extremities bifid.

Surface of valves concentrically marked by fine lines of growth.

Formation and locality. In the Hudson-river group at Cincinnati, Ohio. From the collection of Mr. C. B. Dyer.

LEPTOBOLUS OCCIDENTALIS *n. sp.*

PLATE 7, fig. 18.

Shell minute, usually measuring about eight-hundredths of an inch in length in full grown individuals; orbicular or broadly ovate in outline, widest below the middle, and somewhat pointed at the beak; valves moderately convex, most prominent near the beak.

Surface marked by concentric lines of growth sometimes forming varices.

Formation and locality. Very numerous in some dark shales of the Hudson-river group (probably of the Utica slate horizon) at Hawley's mill, twelve miles west of Dubuque, Iowa; and at Platteville, Wisconsin, on the authority of specimens labeled by Mr. T. J. Hale.

LEPTOBOLUS INSIGNIS *n. sp.*

PLATE 7, fig. 17.

Shell minute, orbicular, with a scarcely pointed beak; valves regularly convex when not compressed. Specimens usually flattened.

Surface marked by concentric lines of growth.

This species differs from the preceding in being more nearly circular, with a shorter beak and more regularly convex valves, and both this and the preceding species differ from *L. lepis* in being much less elongate, and not so distinctly oval.

Formation and locality. In the Utica slate at Middleville in Herkimer county; near Fort Plain; at Utica, and other places in New York.

Genus—LYRODESMA *Conrad.*

Annual Geol. Report, N. Y., for 1841, p. 51.

"Equivalved, inequilateral; hinge with about eight diverging prominent cardinal teeth, transversely striated."

The above description of Mr. Conrad has been verified in the discovery of additional specimens of the *L. plana* Conr. and of other species of the genus. The following species possess but six diverging crenulate teeth, showing the necessity of modifying the generic description.

LYRODESMA CINCINNATIENSIS *n. sp.*

PLATE 7, fig. 28.

Shell small, subrhomboidal in outline, and obtusely pointed at the postero-basal angle; valves moderately convex with a subangular umbonal ridge and narrow cardinal slope; anterior end rounded and passing into the more broadly rounded basal line; posterior end oblique, pointed below; hinge line short; beak very small. Hinge plate occupied by six angular, crenulated, radiating teeth, which, diverging from beneath the beak, are strongly arched upwards between their origin and extremities; crenulations minute but very distinct; muscular impressions and pallial line not observed.

Differs from *L. poststriati* and *L. plana* in the much shorter form and in number of teeth.

Formation and locality. In the Hudson-river group at Cincinnati, Ohio. From Mr. C. B. Dyer.

TELLINOMYA PECTUNCULOIDES *n. sp.*

PLATE 7, fig. 26.

Shell small, subcircular in outline, with the posterior end slightly prolonged below the middle, giving a little obliquity to the shell; posterior cardinal border obliquely sloping to the point of greatest extension; anterior and basal borders regularly rounded; beaks small; general surface of the valves depressed convex. Hinge plate strongly arcuate, more abruptly curving in the middle, occupied by ten or twelve teeth on each side of the center, those in the middle being nearly straight, becoming more and more bent and angular toward the extremities; muscular impressions large and distinct; pallial line strongly marked, situated considerably within the border of the valve.

Surface characters of the valves not observed.

This species is more nearly circular than any species yet described from rocks of this age, and may be easily distinguished by this feature as well as the gentle convexity of the valves.

Formation and locality. In shales of the age of the Hudson-river group, at Cincinnati, Ohio. In the cabinet of Mr. C. B. Dyer.

Genus—CLIDOPHORUS *Hall.*

Palæontology of N. Y., vol 1, p. 300.

When originally described, the species of this genus were supposed to be destitute of hinge teeth, or at least of crenulations like the Nuculæ. Several years since, however, I had determined that some western forms referred by me to the genus were crenulate on the hinge line, and during the past year the same character has been observed in the typical forms of the genus from the Hudson-river shales of New York. Should the arrangement of the crenulations prove the same as in NUCULITES, it will probably be found to possess no other distinction sufficient to separate it from that genus.

Genus—FUSISPIRA *nov. gen.*

Shell fusiform, imperforate, spire more or less elevated, with rounded volutions; aperture elongate-ovate or elliptical, produced below, forming a subrimate canal; columella slightly twisted, without folds, peristome sharp.

Surface smooth.

Types of the genus, *Fusispira ventricosus* and *F. terebriformis.*

The shells for which the above generic name is proposed have the general form of FUSUS, and particularly the group included under the name TRITONOFUSUS Beck; being smooth shells with subequal extremities, but the columella is much less twisted, which gives to them a more erect aspect. They differ from SUBULITES in not being truncate at the base of the columella, and in being destitute of the deep basal notch characteristic of that genus.

So far as at present known they are confined to the Trenton and Hudson-river periods.

The two following species described in the Palæontology of N. Y., Vol. I, will probably prove to belong to this genus: *Murchisonia vittata* = *Fusispira vittata*, and *Murchisonia subfusiformis* = *F. subfusiformis.*

FUSISPIRA VENTRICOSA *n. sp.*

PLATE 8, fig. 6.

Shell ventricose, consisting of six or seven volutions, the first three or four slender, the subsequent ones more rapidly expanding and ventricose, giving an unequally increasing spire; body volution large, occupying two-thirds of the entire length of the shell; suture distinct, not channelled or impressed. Aperture narrow oblique, modified by the preceding volution and nearly equalling one-half the length of the shell; columella less than half the length of the shell, slightly twisted, base rounded below, forming a broad shallow canal; outer lip sharp, directed forward in the middle.

Length of specimen described two and three-fourths inches; diameter of body whorl one inch and three-eighths.

Formation and locality. In the Trenton limestone at De Pere, three miles north of Green Bay.

FUSISPIRA ELONGATUS *n. sp.*

PLATE 8, fig. 5.

Shell elongate fusiform, spire slender and elevated, gradually tapering; volutions moderately convex, number unknown, but judging from those remaining there have been at least eight, of which the last one forms fully one-half of the length of the shell; aperture very long and narrow; columella very much produced; canal broad and shallow; outer lip directed forward in the middle.

This species resembles the *F. vittata* (*Murchisonia vittata* of Pal. N. Y., Vol. I, p. 181, pl. 39), but differs in the form of the volutions and in being more produced below than any of the specimens of that species.

Length of the four last volutions three and three-fourth inches, diameter of body whorl one inch and one-fourth.

Formation and locality. In the Trenton limestone, half a mile west of Elkader, Iowa.

Fusispira terebriformis *n. sp.*

Plate 8, fig. 4.

Shell terete, acute (subfusiform), consisting of about six, gradually increasing, depressed-convex volutions, the last one of which forms about two-fifths of the entire length of the shell, exclusive of the anterior prolongation; aperture narrow, obliquely elliptical, strongly modified above by the preceding volution, and prolonged below, forming an extended canal.

Surface apparently smooth. Apicial angle about thirty degrees.

Formation and locality. In the Hudson-river group, at Cincinnati, Ohio.

Cyrtolites Dyeri *n. sp.*

Plate 8, figs. 7, 8.

Shell small, laterally compressed, consisting of two or more volutions, the outer one embracing the inner for about half its breadth, bearing a moderately wide umbilicus, in which may be seen a portion of the preceding volution; sides of the volution convex, obtusely subangular near the margin of the umbilicus into which it curves abruptly and more gradually declines with a slight convexity, toward the salient subcarinate dorsum. Transverse section cordiform, broadest near the umbilical margin.

Surface of shell marked by from eight to twelve nearly equidistant revolving ridges, with sometimes smaller intermediate ones, and also crossed by numerous closely arranged transverse lamellose ridges having a double backward flexure between the revolving lines, and a general retral direction towards the keel of the shell.

This species differs in the character of its surface markings from any of the forms heretofore described.

Formation and locality. In the shales of the Hudson-river group at Cincinnati, Ohio. From the collection of Mr. C. B. Dyer.

LEPERDITIA (ISOCHILINA) CYLINDRICA *n. sp.*

PLATE 8, fig. 12.

Carapace minute, seldom exceeding two-hundredths of an inch in length, nearly twice as long as wide: valves very convex and cylindrical, the anterior and posterior ends subequal and strongly rounded; cardinal line much shorter than the length of the valve; tubercle obsolete.

Surface smooth.

There appears to be no tubercle or prominence of any kind on the surface of this minute species, and so far as can be ascertained the valves do not overlap on the basal border, but as they have not been seen in connection, this feature, on so small a species, may easily be overlooked.

Formation and locality. In the Hudson-river group at Cincinnati. From Mr. C. B. Dyer, and in former collections from Cincinnati.

LEPERDITIA (ISOCHILINA) MINUTISSIMA *n. sp.*

PLATE 8, fig. 13.

Carapace minute, less than two-hundredths of an inch in length, the width being about two-thirds the length, greatest at the anterior third, giving a broadly ovate outline, with a straight cardinal margin of about two-thirds the length of the valve.

Surface of the valves smooth, rising into an obtusely pointed prominence at the anterior third of the length; basal margin of valves not overlapping, so far as can be ascertained.

Formation and locality. In the Hudson-river group at Cincinnati, Ohio. From Mr. C. B. Dyer.

BEYRICHIA TUMIFRONS *n. sp.*

PLATE 8, fig. 11.

Carapace small, subreniform or semielliptical, dorsal margin straight nearly as long as the entire length of the valve; anterior and posterior extremities equal in width, or sometimes having the anterior a little wider; extremities sharply rounded, basal margin very broadly rounded. Surface of valves moderately convex with a deep narrow marginal groove on the basal margin, which becomes obsolete on the ends before reaching the dorsal angles, leaving a sharp carinate border. Body of the valve strongly constricted by two deep oblique sulci, the posterior one originating in the basal groove and extending obliquely backward two-thirds across the valve; the second extends entirely across the valve at about one-third the length from the anterior end, and is strongly curved backwards in the middle, so that the anterior portion of the valve forms a rounded area which is often the most prominent part of the body, though in some specimens the central ridge is equally prominent.

Surface minutely granulose. Length about six-hundredths of an inch, width about three-hundredths.

This species differs from the *B. oculifer* in being destitute of the prominent eye tubercle.

Formation and locality. In the Hudson-river rocks at Cincinnati, Ohio, from old collections.

BEYRICHIA OCULIFER *n. sp.*

PLATE 8, figs. 9, 10.

Carapace small, seldom exceeding seven-hundredths of an inch in length, by three to four-hundredths in the greatest breadth in the largest specimens; valves obliquely subreniform, broadest near the anterior end, with a straight hinge line, which is a little shorter than the greatest length of the valve; anterior end projecting beyond the hinge; center moderately convex, with a proportionally broad, deep channel just within the margin, extending all around it, except for a short distance at the posterior extremity near the dorsal margin. The body of the valve is crossed obliquely by two deep furrows, having their origin on the dorsal margin, the posterior one situated a little more than one-third of the length of the valve from the posterior extremity and extending fully two-thirds across it; the anterior furrow is situated just behind the anterior third of the length, and in its lower portion is more strongly curved forward than the other. Eye tubercle large, pedunculated, very prominent, and spreading at the top, its surface equal to about one-third the width of the valve, and its height at the posterior margin equal to the breadth of the top, while the anterior margin is but little elevated, giving an obliquely sloping circular surface, with a denticulated border. This surface, under a strong magnifier, is seen to be covered by fine eye-like facets,* similar to those of the eyes of trilobites of the genus ILLÆNUS.

This species is very distinct from any other described, in the form and strength of the transverse furrows, and especially in the great prominence of the club-shaped eye tubercle. So far as can be ascertained, it is the first species of this group of crustaceans in which the eye facets have been detected.

Formation and locality. In the Hudson-river shales at Cincinnati, Ohio. From Mr. C. B. DYER, and also among old collections from the same locality.

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* A feature first observed by Mr. Whitfield.

ERRATA.

Page 36, line 19, after OBSCURUS insert (Lesu.).
Page 36, line 26, after TIBURO insert (Val.).
Page 36, line 27, for *Zygoena* read *Zygœna.*
Page 39, line 7, dele † before Lutjanus.
Page 47, line 25, for Peckianum read Peckiana.
Page 49, line 34, for Tintinabulum read Tintinnabulum.
Page 56, line 3, for appendiculata *Curt.* read inaurata *B. & Br.*
Page 63, line 16, for rotton read rotten.
Page 75, line 12, for SIMILLIMUS read SIMILLIMA.
Page 85, line 1, for MYCROTHYRIUM read MICROTHYRIUM.
Page 87, line 1, for CLAVÆSPORIUM read CLAVÆSPORUM.
Page 94, line 1, for CHRYSOSPERUM read CHRYSOSPERMUM.
Page 102, line 9, for DELISIÆI read DELISÆI.
Page 109, line 3 should follow line 1.
Page 134, lines 28 and 37, for *parthenos* read *Parthenos.*
Page 135, line 4, for (Linn) read (Linn.).
Page 158, line 14, after Idalia, read (*Drury*) instead of *Fabr.*
Page 158, line 16, after Myrina, read (*Cram.*) instead of *Fabr.*
Page 158, line 17, after tharos, read (*Drury*) instead of *Boisd. et Lec.*
Page 159, line 17, after niphon, read (*Hübn.*) instead of *Westw.*
Page 167, line 26, before the comma, insert, of a fence.
Page 168, line 14, for gordius read Gordius.
Page 168, line 28, for *Harris* read (*Boisd.*).
Page 169, line 33, for ferruginaria *Pack. MS.*, read homuraria *Gr.-Rob.*
Page 169, line 37, dele ? after semiclarata.
Page 170, line 1, for *Hübn.* read (*Hübn.*).
Page 186, lines 41 and 42, for Niagara limestone, read Clinton group.
Page 187, line 14, the *formation and locality* should read: From the *Pentamerus oblongus* beds of the Clinton group, at Bear-grass creek, near Louisville, Ky.
Page 205, line 37, dele and *Proetus parviusculus.*
Page 214, lines 11 and 29, for PLATE 2 read PLATE 6.
Page 215, line 15, after AGELACRINUS insert (STREPTASTER).
Page 229, line 7, for *ventricosus* read *ventricosa.*
Page 229, line 36, for *elongatus* read *elongata.*

NOTE.—The Report on the State Museum of Natural History is printed, in the ordinary course, as a legislative document of 800 copies. The copies for the Regents of the University and for the State Museum are printed by a distinct legislative order, but bear the date of the documentary edition, which, in the present instance, was printed and delivered in 1872, according to the imprint of the title page.

PLATES AND EXPLANATIONS.

PLATE I.

CORTINARIUS (INOLOMA) ASPER Pk.

Page 72.

Fig. 1. A specimen of ordinary size.
Fig. 2. Vertical section of a pileus of a young plant.
Fig. 3. Spores magnified.

AGARICUS (COLLYBIA) SPINULIFER Pk.

Page 62.

Figs. 4, 5. Specimens of ordinary size; one with a young plant attached to its base.
Fig. 6. Vertical section of a pileus.
Fig. 7. Transverse section of a stem.
Fig. 8. Spine-like processes of the lamellæ, magnified.
Fig. 9. Spores magnified.

AGARICUS (OMPHALIA) LILACINUS Pk.

Page 63.

Figs. 10, 11. Specimens of ordinary size.
Fig. 12. Vertical section of a pileus.
Fig. 13. Transverse section of a stem.

MONOTOSPORA TRISEPTATA Pk.

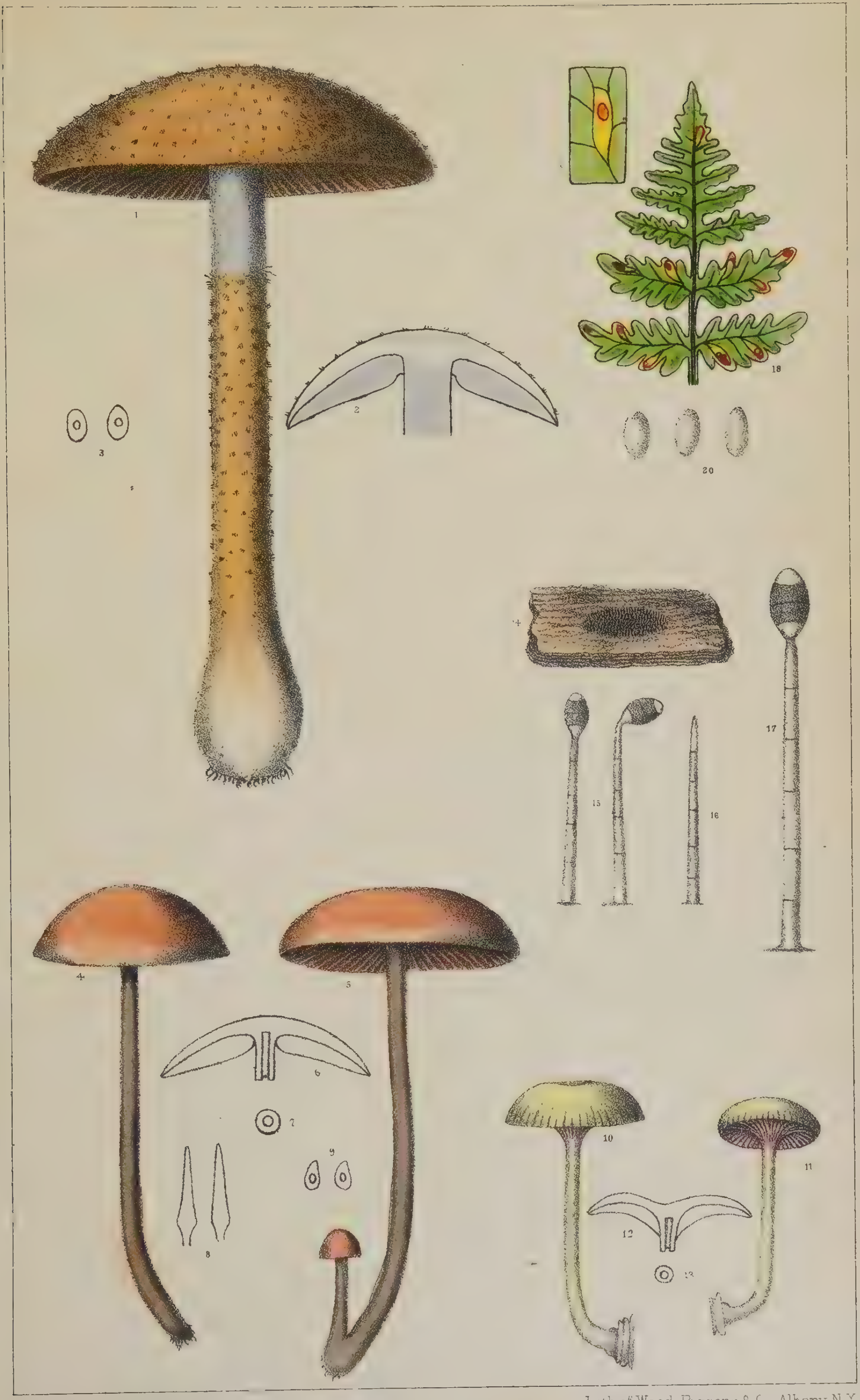
Page 94.

Fig. 14. A piece of wood bearing a patch of plants.
Fig. 15. Two fertile plants magnified.
Fig. 16. A sporeless plant magnified.
Fig. 17. A plant with its spore more highly magnified.

UREDO ASPIDIOTUS Pk.

Page 88.

Fig. 18. Part of a frond of *Phegopteris Dryopteris* bearing *Uredo Aspidiotus.*
Fig. 19. A spot and sorus magnified.
Fig. 20. Spores magnified.



On Stone by Rieman
Lith. of Weed Parsons & C° Albany N.Y.

PLATE II.

Bolbitius nobilis Pk.

Page 71.

Figs. 1, 2. Specimens of ordinary size; one with a young plant attached to its base.
Fig. 3. Vertical section of a pileus.
Fig. 4. Transverse section of a stem.

Boletus bicolor Pk.

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Fig. 5. A specimen of ordinary size.
Fig. 6. Vertical section of a pileus.
Fig. 7. Mouths of tubes magnified.
Fig. 8. Spores magnified.

Agaricus (Psilocybe) Limicola Pk.

Page 70.

Figs. 9, 10. Specimens of ordinary size; one with a young plant attached to its base.
Fig. 11. Vertical section of a pileus.
Fig. 12. Transverse section of a stem.
Fig. 13. Spores magnified.

Agaricus (Entoloma) cuspidatus Pk.

Page 64.

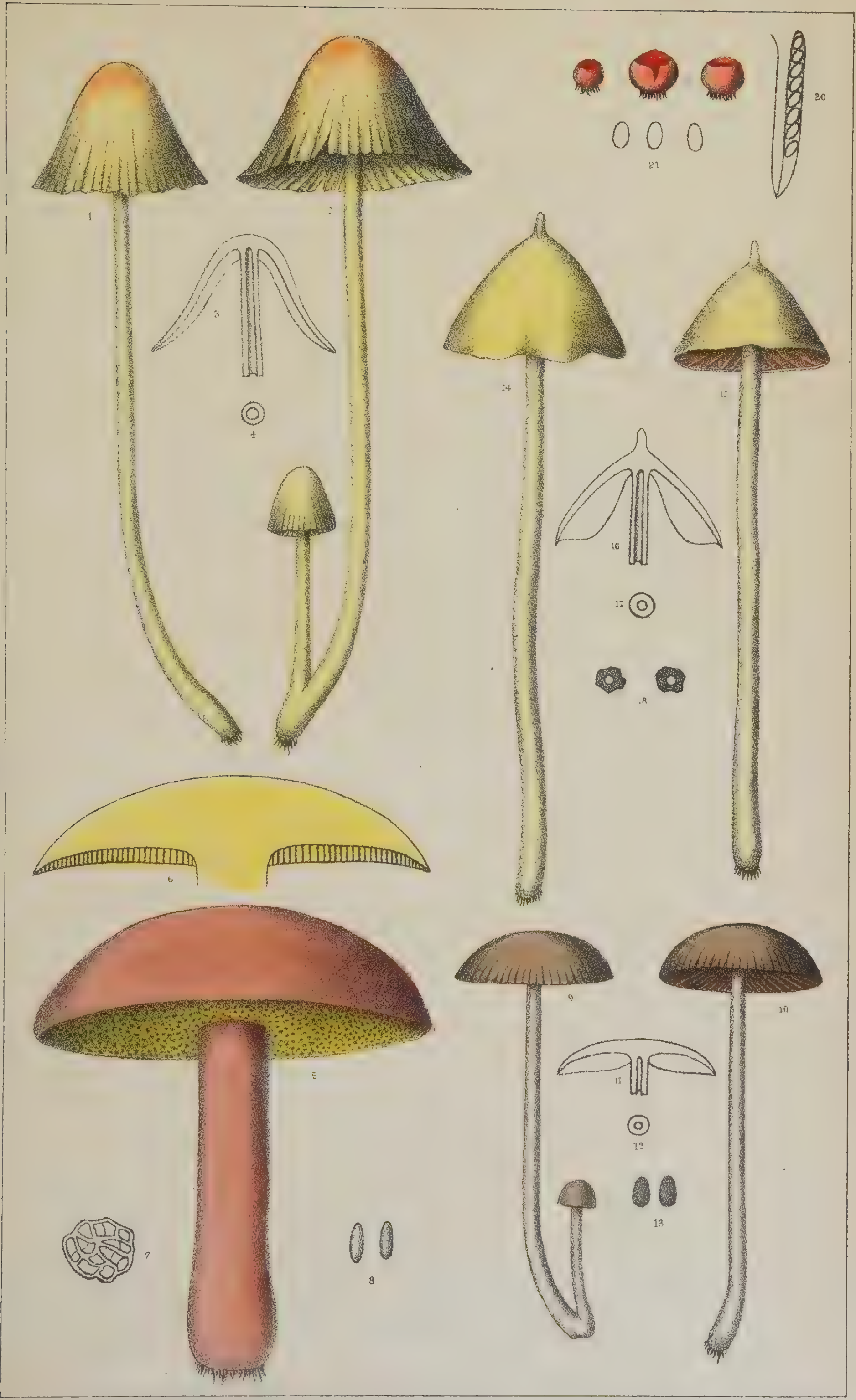
Figs. 14, 15. Specimens of ordinary size.
Fig. 16. Vertical section of a pileus.
Fig. 17. Transverse section of a stem.
Fig. 18. Spores magnified.

Peziza rubra Pk.

Page 95.

Fig. 19. Specimens of ordinary size.
Fig. 20. A paraphysis and an ascus with its spores, magnified.
Fig. 21. Spores more highly magnified.

FUNGI.



On Stone by Rieman.
Lith. of Weed, Parsons & Co. Albany, N.Y.

PLATE III.

AGARICUS (HEBELOMA) ASCOPHORUS Pk.

Page 68.

Figs. 1, 2. Specimens of ordinary size.
Fig. 3. Vertical section of a pileus.
Fig. 4. Transverse section of a stem.
Fig. 5. A sack with its spores, magnified.
Fig. 6. Spores magnified.

STILBUM GIGANTEUM Pk.

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Fig. 7. A tuft of plants of ordinary size.
Fig. 8. A fertile and sterile plant, magnified
Fig. 9. Spores magnified.

PEZIZA ECHINOSPERMA Pk.

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Fig. 10. A lump of earth bearing five plants.
Fig. 11. A plant magnified.
Fig. 12. A paraphysis and an ascus with its spores, magnified.
Fig. 13. A spore more highly magnified.

PUCCINIA TRIPUSTULATA Pk.

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Fig. 14. A leaflet of *Rubus villosus* bearing *Puccinia tripustulata.*
Fig. 15. A spot and two sori magnified.
Fig. 16. Spores magnified.

TRICHOBASIS IRIDICOLA Pk.

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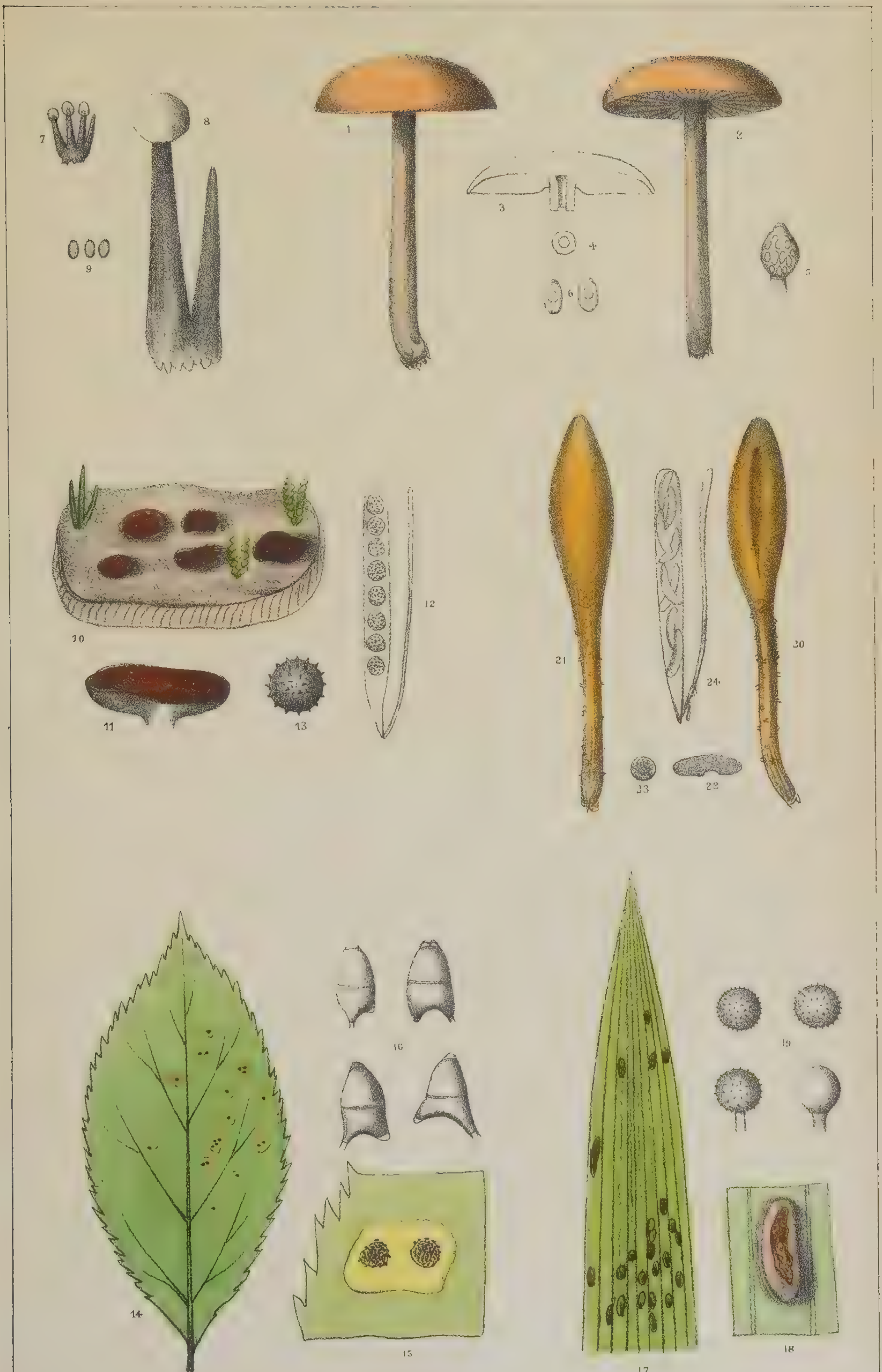
Fig. 17. Part of a leaf of *Iris versicolor* bearing *Trichobasis Iridicola.*
Fig. 18. A sorus magnified.
Fig. 19. Spores magnified.

GEOGLOSSUM LUTEUM Pk.

Page 94.

Figs. 20, 21. Specimens of ordinary size showing opposite faces of the club.
Fig. 22. Transverse section of a club.
Fig. 23. Transverse section of a stem.
Fig. 24. A paraphysis and an ascus with its spores, magnified.

State Mus. Nat. Hist. 24. FUNGI Plate 3



On Stone by Swinton.
Lith. of Weed, Parsons & Co. Albany, N.Y.

PLATE IV.

AGARICUS (HEBELOMA) ILLICITUS Pk.

Page 68.

Figs. 1, 2. Specimens of ordinary size.
Fig. 3. Vertical section of a pileus.
Fig. 4. Transverse section of a stem.
Fig. 5. Spores magnified.

AGARICUS (ENTOLOMA) SALMONEUS Pk.

Page 65.

Fig. 6. A specimen of ordinary size.
Fig. 7. Vertical section of a pileus.
Fig. 8. Transverse section of a stem.
Fig. 9. Spores magnified.

COPRINUS SILVATICUS Pk.

Page 71.

Figs. 10, 11. Specimens of ordinary size.
Fig. 12. Vertical section of a pileus.
Fig. 13. Transverse section of a stem.
Fig. 14. Spores magnified.

COPRINUS SEMILANATUS Pk.

Page 71.

Fig. 15. A specimen of ordinary size.
Fig. 16. Vertical section of a pileus.
Fig. 17. Transverse section of a stem.
Fig. 18. Spores magnified.

MARASMIUS PULCHERRIPES Pk.

Page 77.

Figs. 19, 20. Specimens of ordinary size.
Fig. 21. Vertical section of a pileus, magnified.
Fig. 22. Transverse section of a stem, magnified.

NODULARIA BALSAMICOLA Pk.

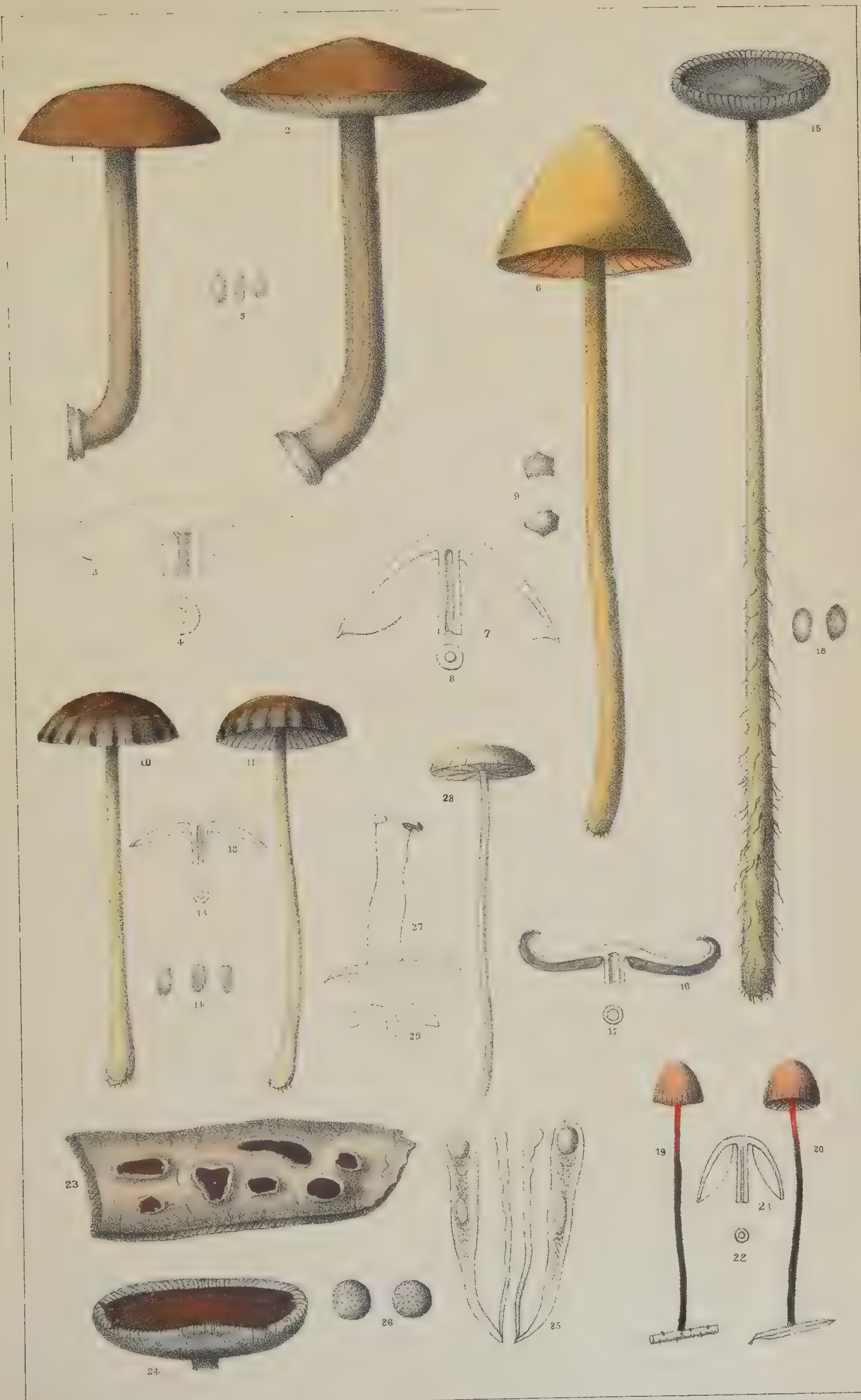
Page 96.

Fig. 23. A piece of bark bearing several plants.
Fig. 24. A plant magnified.
Fig. 25. Paraphyses and asci with partly formed spores, magnified.
Fig. 26. Spores magnified.

MARASMIUS FILOPES Pk.

Page 77.

Fig. 27. Specimens of ordinary size.
Fig. 28. A plant magnified.
Fig. 29. Vertical section of a pileus magnified.



Stone by Newton

Lith.of Weed, Parsons & Co. Albany, N

PLATE V.

Heterocrinus (Iocrinus) Polyxo Hall, 1866.*

Page 212.

Fig. 1. Lateral view of a specimen with arms, wanting the basal plates. Received from S. T. Carley, of Cincinnati.

Fig. 2. A more complete specimen, preserving a large portion of the arms, and about five inches in length of the column. Received from W. H. Thomas, formerly of Cincinnati.

Figs. 3, 4. Anterior and posterior views of the body of an older specimen of the same species, corresponding more nearly with *H. crassus* M. & W. Collection of U. P. James, Esq.

Poteriocrinus posticus Hall, 1871.

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Fig. 5. Anterior view, natural size, showing the body and arms to beyond the first bifurcation.

Fig. 6. Posterior view of the specimen fig. 5, enlarged to two diameters, showing the anal area and lower portion of the proboscis.

Poteriocrinus (Dendocrinus) caduceus Hall, 1866.

Page 208.

Fig. 7. Lateral view of a specimen preserving a portion of the arms and column.

Fig. 8. Antero-lateral view of another individual, preserving a longer portion of the column. Received from J. Kelly O'Neall, of Lebanon, Ohio.

Heterocrinus juvenis Hall, 1866.

Page 212.

Figs. 9, 10. Two views of the same individual enlarged, showing the body, arms and a part of the column. Received from J. Kelly O'Neall, Esq.

Heterocrinus simplex Hall.

Pal. N. Y., vol. 1, *p.* 280.

Fig. 11. Posterior view of a specimen, preserving body and arms, with a few joints of the column.

Fig. 12. Lateral view of a portion of one of the arms, showing the position of the tentacula, which originate from every fourth plate—or upon every second plate on the alternate sides of the entire arm, leaving a single plate between without tentacula.

Heterocrinus constrictus Hall, 1871.

Page 210.

Fig. 13. View of the body with arms attached, showing the characteristic constriction below the base of the arms.

Fig. 14 A portion of one arm enlarged for comparison with *H. simplex*, showing two free plates between the tentacula-bearing plates

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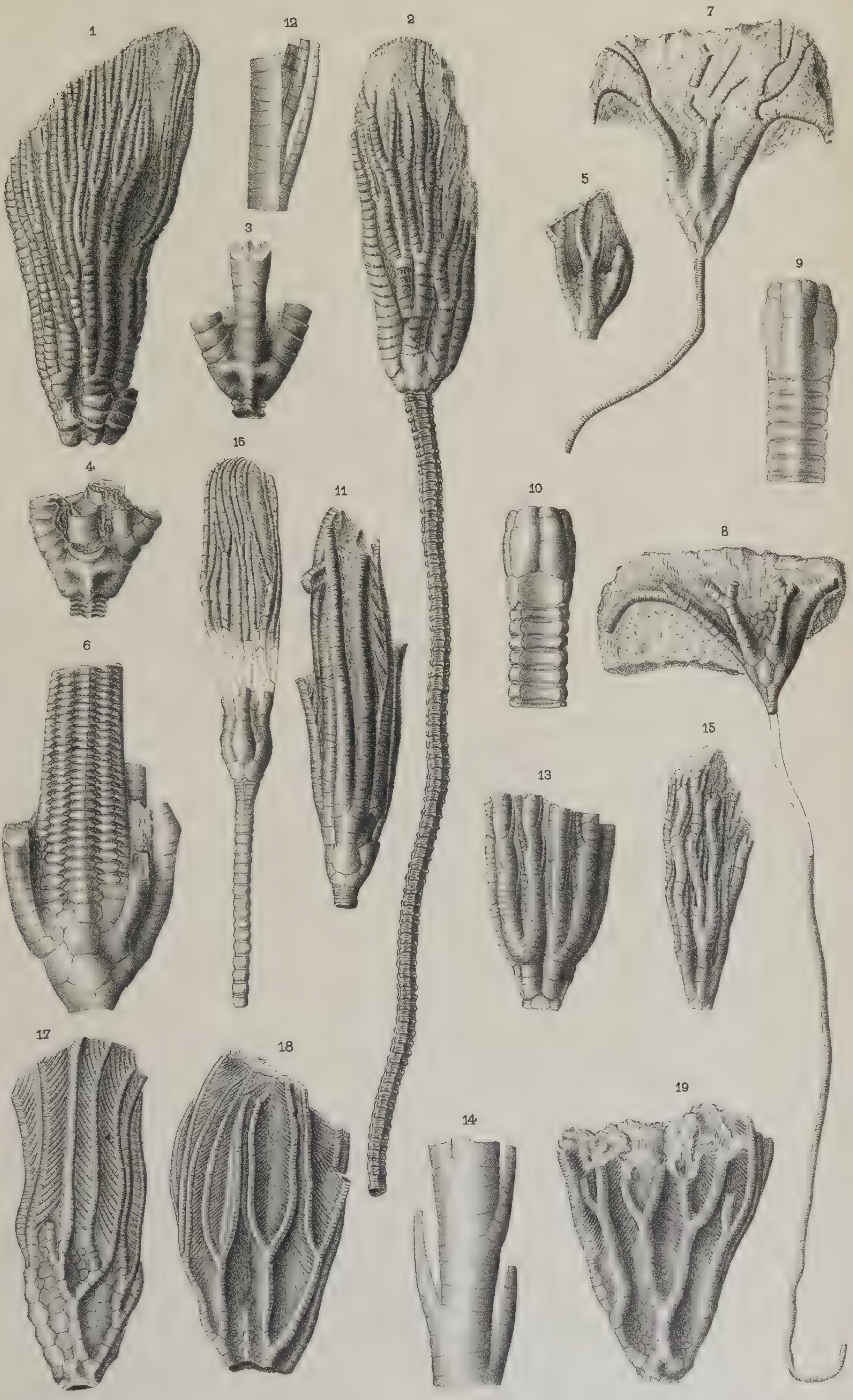
* Published by Meek & Worthen as *Heterocrinus crassus* and *H. subcrassus*. Proceed. Phila. Acad. Nat. Sci., 1865.

HUDSON RIVER GROUP.

State Mus. Nat. Hist. 24. (CRINOIDEA.) Plate 5.



R.P.Whitfield, del. Ph. Ast, lith.

PLATE V.—(Continued).

HETEROCRINUS LAXUS Hall, 1871.

Page 211.

Fig. 15. Lateral view of a specimen, preserving the body and arms.

HETEROCRINUS EXILIS Hall, 1866.

Page 213.

Fig. 16. Posterior view of a specimen, enlarged to two diameters.

GLYPTOCRINUS PARVUS Hall, 1871.

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Fig. 17. Lateral view of specimen, showing body and arms enlarged.

GLYPTOCRINUS NEALLI Hall, 1866.

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Fig. 18. View of a specimen, preserving a part of the body, the interradial areas, and the bifurcation of the arms.

Fig. 19. View of a specimen, preserving the body and arms to beyond the first bifurcation after becoming free.

PLATE VI.

Genus Hemicystites Hall, 1852.

Hemicystites (s. g. *Cystaster**) *granulatus Hall*, 1871.

Fig. 1. View of the summit of a specimen (enlarged to four diameters), showing the rays, which preserve the external plates, with an oval depression at the extremities, from which extends a narrow groove along the center of the ray to the oral plates. The ovarian or anal pyramid is shown as occupying the widest area.

Fig. 2. A lateral view of another individual from which the exterior plates of the rays have been removed. The ovarian pyramid preserves only the lower range of plates. The specimen has been adherent to some foreign body, and the lower margin shows the cicatrix of attachment. (Enlarged 2½ diameters.)

Fig. 3. An oblique summit view of another individual less elevated than the preceding, showing the rays and ovarian pyramid. In the three more distant rays, the outer plates are removed, while they are preserved in the other two. (Enlarged to 2½ diameters.)

Fig. 4. Lateral view of an immature (?) specimen, showing three of the rays denuded of the upper range of plates. The body is more elongate and pointed below, showing no evidence of having been attached. (Enlarged to three diameters.)

These specimens are all from the collection of Mr. C. B. Dyer, of Cincinnati, Ohio.

Agelacrinus (*Hemicystites*) *stellatus Hall*, 1866.

Page 215.

Fig. 5. Summit view of a small individual, enlarged to six diameters. The rays are short, preserving both ranges of plates, of which there are only from seven to eight in each range. The ovarian pyramid is clearly defined and the plates distinct. This individual, and a still smaller one attached to the same shell, have an immature aspect. The plates are arranged in an apparently imbricate order, as in the typical form of the genus. (Enlarged to six diameters.)

Fig. 6. A summit view of a much larger individual (enlarged to four diameters) from the rays of which the upper range of plates have been removed, showing the character of the lower range, and the broad central groove. In the upper left-hand area, the plates are shown to have an imbricating arrangement. From the collection of Mr. C. B. Dyer.

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* A sac-like body, composed of minute plates and surmounted by five rays or ambulacral areas, each one consisting of two series of external plates separated by a narrow groove, and beneath these a more distant series separated by a wider median groove. The structure and arrangement of plates of the body has not been satisfactorily made out in this form, and, therefore, there may be some doubt of its generic relations. The first specimens examined were such as to suggest an immature form of *H. stellatus*; but the uniform character of a granular surface, without visible (or at most very obscure) plates, suggests a distinction. While the greater number of individuals show evidence of having been adherent to some foreign body, a single one (fig. 4) appears to have been quite free. Although a larger amount of materials would be desirable for examination before deciding upon a separation from Hemicystites, I would suggest for a provisional term the name of Cystaster.

HUDSON RIVER GROUP.

(CYSTOIDEA.)

State Mus. Nat Hist. 24.

Plate 6

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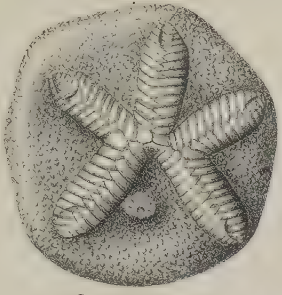

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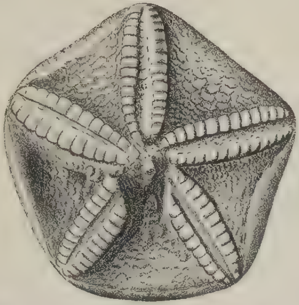

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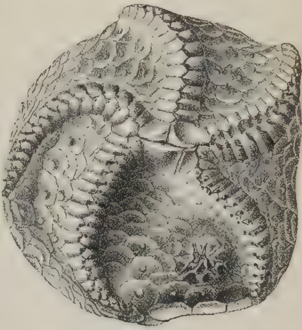

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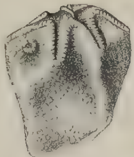

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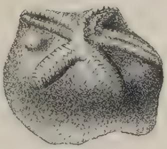

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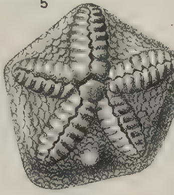

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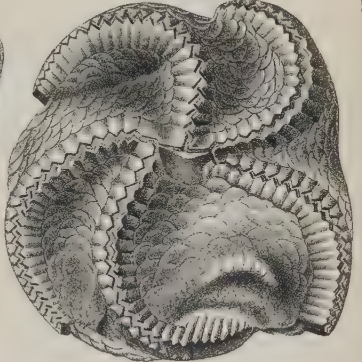

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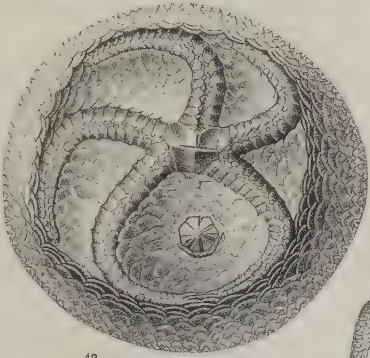

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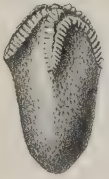

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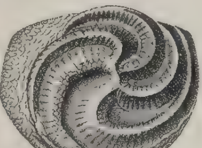

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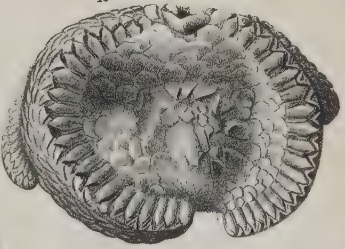

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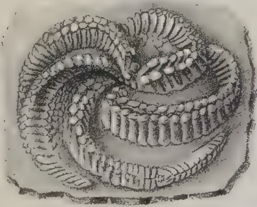

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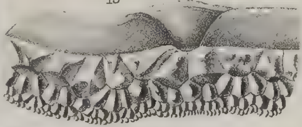

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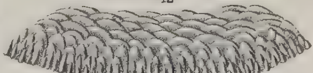

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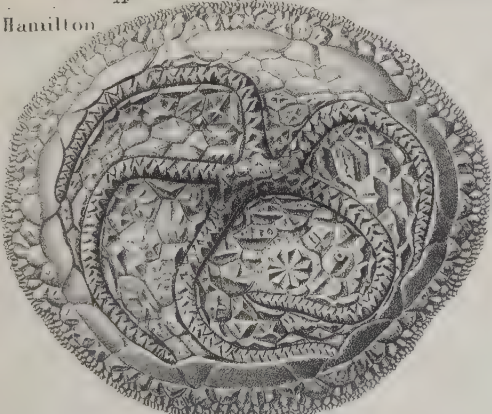

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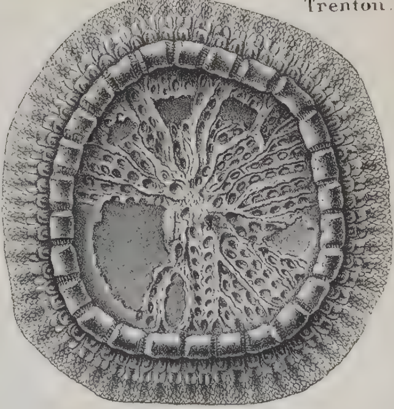

PLATE VI.—(Continued).

AGELACRINUS (*LEPIDODISCUS*) *CINCINNATIENSIS* *Roem.*

Page 214.

Fig. 7. A figure of a specimen from Cincinnati, Ohio, showing the characters of the species. (Enlarged to two and one-half diameters.)

AGELACRINUS (*LEPIDODISCUS*) *PILEUS* *Hall*, 1866.

Page 214.

Fig. 8. Figure of a specimen showing the rays, the oral plates and ovarian pyramid. Along the depression, at the summit of three of the rays, may be seen the minute pores passing between the plates. Many of the plates in the interambulacral areas have a rounded node near the center.

Fig. 9. A summit view of a larger individual of the same species. Collection of Mr. C. B. Dyer.

Fig. 10. View of one of the interambulacral areas, probably the posterior one, limited by two of the rays, and showing a part of the mouth at the summit, and the extremities of two other rays at the sides. The specimen has been crushed so as to conceal the other parts of the body.

Fig. 8 is enlarged to four diameters, and the others to three diameters each.

AGELACRINUS [*STREPTASTER*] *VORTICELLATUS* *Hall*, 1866.

Page 215.

Fig. 11. A summit view of a partially crushed specimen, the five curving rays and a portion of the imbricating plates of the body (2½ diameters).

Fig. 12. A portion of the body of this species, still farther enlarged, to show the arrangement of the plates of the margin.

Fig. 13. A specimen, preserving the plates of the rays only. The other portions of the body have been removed by weathering. (Enlarged to two diameters.) Collection of Mr. C. B. Dyer.

AGELACRINUS HAMILTONENSIS.

Agelacrinites Hamiltonensis Vanuxem. *Geological Report, Third District, New York.*

Fig. 14. A view of the original specimen of this species (enlarged to two diameters) showing the arrangement of the plates, rays, etc.

Fig. 15. A portion of the border, still farther enlarged, to show the arrangement of the marginal plates.

CYCLOCYSTOIDES SALTERI *Hall*, 1866.

Page 218.

Fig. 16. Surface of specimen described (enlarged to three diameters).

PLATE VII.

LICHENOCRINUS DYERI *Hall*, 1866.

Page 216.

Fig. 1. A specimen of natural size, preserving a portion of the column to the length of four inches.

Fig. 2. A body with a portion of the column attached, enlarged to three diameters.

Fig. 3. Summit of specimen, as it lies attached to the surface of a shell, enlarged to four diameters.

Fig. 4. Enlarged view of a specimen attached to the shell of *Orthis testudinaria*, the marginal portion showing the interior striæ, probably from the action of weathering.

Fig. 5. The interior of the crinoidal body, as exposed from the weathering and removal of the exterior plates, a few of which remain on the lower left hand margin of the figure; enlarged to three diameters.

Fig. 6. The lower or attached surface, drawn from a detached specimen, enlarged to three diameters.

LICHENOCRINUS CRATERIFORMIS *Hall*, 1866.

Page 217.

Fig. 7. The exposed side of an attached specimen, enlarged to three diameters. It is probable that the larger size of plates and other features of distinction noticed, may be only of varietal importance.

PHOLIDOPS TRENTONENSIS *Hall*, 1866.

Page 221.

Fig. 8. Exterior of the valves, showing the form and lines of growth. The specimen is somewhat crushed. Enlarged to four diameters.

PHOLIDOPS SUBTRUNCATUS *Hall*, 1847.

Page 221.

Fig. 9. Exterior view of specimen, enlarged to four diameters.

PHOLIDOPS CINCINNATENSIS *n. sp.*

Fig. 10. A minute oval-ovate shell, differing from the *P. subtruncatus* in being regularly curved in front. It corresponds very nearly in form with the *P. squamiformis* of the Niagara group of New York. Enlarged to four diameters.

CRANIA TRENTONENSIS *Hall*, 1866.

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Figs. 11, 12. Upper side and profile view of a dorsal valve, showing the general form and characters of the species, natural size.

CRANIA SETIGERA *Hall*, 1866.

Page 220.

Figs. 13, 14. Upper and profile views of a dorsal valve, the specimen enlarged two diameters.

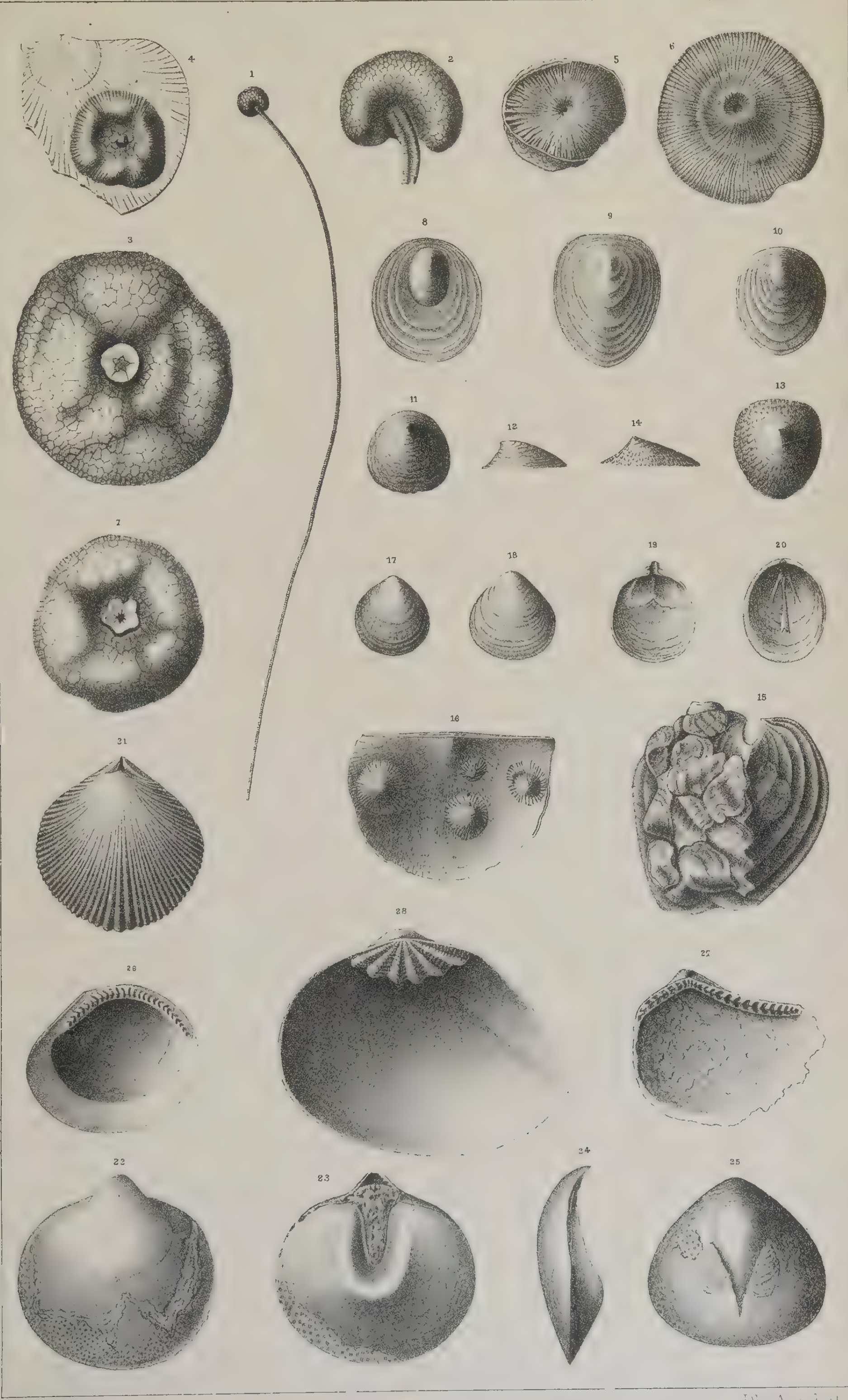

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PLATE VII.—(Continued).

CRANIA SCABIOSA Hall, 1866.

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Fig. 15. Profile view of a specimen of *Orthis biforatus*, partially covered with shells of this species.

CRANIA LÆLIA Hall, 1866.

Page 220.

Fig. 16. Ventral view of a specimen of *Streptorhynchus planumbona*, showing four individuals of this species attached to its surface.

LEPTOBOLUS INSIGNIS Hall, 1871.

Page 227.

Fig. 17. Exterior view of specimens of the species, enlarged to six diameters.

LEPTOBOLUS OCCIDENTALIS Hall, 1871.

Page 227.

Fig. 18. Exterior of a specimen of this species, enlarged to six diameters.

LEPTOBOLUS LEPIS Hall, 1871.

Page 226.

Figs. 19, 20. Interiors of a ventral and dorsal valve, enlarged.

ORTHIS (?) ELLA Hall.

Thirteenth Report N. Y. State Cabinet Nat. Hist., page 121.

Fig. 21. Dorsal view of specimen, more finely plicated than ordinarily; enlarged.

TREMATIS MILLEPUNCTATA Hall, 1866.

Page 221.

Fig. 22. Dorsal view, preserving a portion of the punctate covering of the shell.

Fig. 23. Ventral view of the same individuals, showing the terminal slit, the beak and depressed area of the dorsal valve.

Fig. 24. Profile view of the same specimen.

Fig. 25. A partial cast of the interior of the dorsal valve of the same species (?) showing muscular impressions. The figures representing this species are enlarged.

TELLINOMYA PECTUNCULOIDES Hall, 1871.

Page 228.

Fig. 26. View of the interior of the left valve, enlarged to two diameters.

TELLINOMYA LEVATA Hall.

Nucula levata, Pal. N. Y. vol. I, p. 150.

Fig. 27. Interior of right valve, showing hinge-structure, etc., enlarged to three diameters. Collection of Mr. Dyer.

LYRODESMA CINCINNATENSIS Hall, 1871.

Page 227.

Fig. 28. Interior of a right valve, showing the hinge structure; enlarged.

PLATE VIII.

*CYCLONEMA VARICOSA** *Hall*, 1871.

Fig. 1. A young individual, from Cincinnati, Ohio. Collection of Mr. Dyer.

Fig. 2. View of a specimen showing the aperture; one of the specimens originally described. From Tennessee.

Fig. 3. An outline figure of the aperture of *Cyclonema bilix*, for comparison with the preceding figures. Collection of Mr. Dyer.

FUSISPIRA TEREBRIFORMIS Hall, 1871.

Page 230.

Fig. 4. View of a specimen of this species.

FUSISPIRA ELONGATA Hall, 1871.

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Fig. 5. View of the specimen described.

FUSISPIRA VENTRICOSA Hall, 1871.

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Fig. 6. View of the specimen described.

CYRTOLITES DYERI Hall, 1871.

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Fig. 7. Lateral view of the specimen, enlarged to two diameters.

Fig. 8. Dorsal view of the same, showing the form of the aperture.

BEYRICHIA OCULIFER Hall, 1871.

Page 232.

Fig. 9. Lateral view of a left valve, showing the oculiform tubercle.

Fig. 10. Profile view of the same, showing the elevation of the eye; enlarged.

BEYRICHIA TUMIFRONS Hall, 1871.

Page 231.

Fig. 11. Lateral view of a left valve, enlarged.

LEPERDITIA (*ISOCHILINA*) *CYLINDRICA Hall*, 1871.

Page 231.

Fig. 12. A right valve, enlarged.

LEPERDITIA (*ISOCHILINA*) *MINUTISSIMA Hall*, 1871.

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Fig. 13. View of a left valve showing the nearly central tubercle.

PROETUS PARVIUSCULUS Hall, 1866.

Page 223.

Fig. 14. View of an entire individual, enlarged to four diameters.

DALMANIA BREVICEPS Hall, 1866.

Page 223.

Fig. 15. View of the upper side of the specimen described.

Fig. 16. Profile view in outline.

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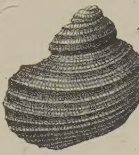
* Fourteenth Report on the State Cabinet of Natural History, p. 91, 1861. Published under the name of *C. ventricosa*, by mistake.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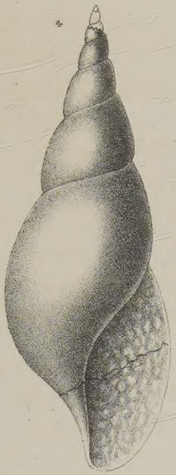
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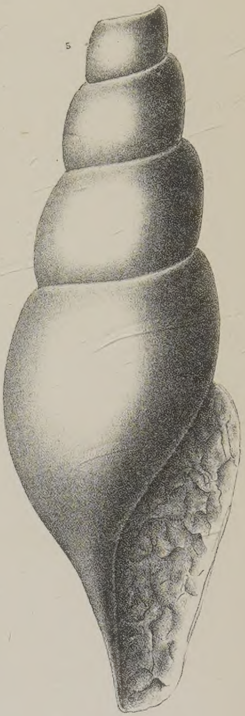
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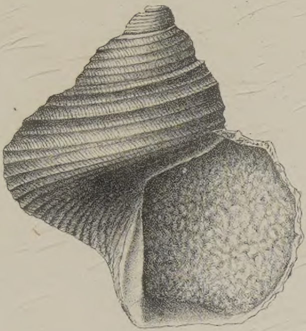
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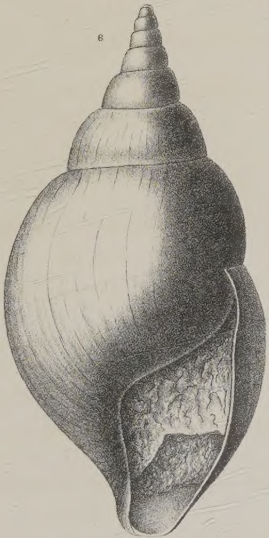
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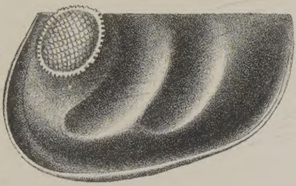
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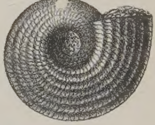
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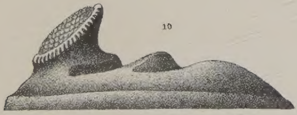
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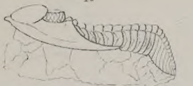
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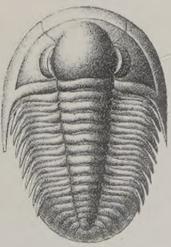
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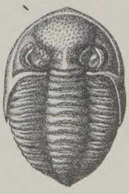
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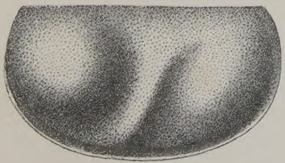
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